

APPENDIX F
TIER 3 VAPOR INTRUSION ASSESSMENT DATA

REVISED DRAFT
REMEDIAL INVESTIGATION REPORT

Capital Industries, Inc.
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-004

Table 1
Summary of Indoor and Outdoor Air Sampling Results
5801 Third Avenue South (QC and Laser Office)
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	Tetrachloroethene					Trichloroethene					cis-1,2-dichloroethene				
		C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}
5801 3rd Ave South (Capital QC and Laser Office)	4/13/2011	0.115	0.115	0.000	0.000	0.000	0.046	0.420	0.374	1.626	0.055	0.065	0.070	0.005	-	0.001
Commercial Indoor Air IPIMAL - Cancer ¹		0.97					0.23					-				
Commercial Indoor Air IPIMAL - Non-cancer ¹		120					6.8					6.8				

NOTES:

Results in **bold** denote concentrations above the laboratory method reporting limit. Where concentrations are below the method reporting limit, a value one half of the method reporting limit is recorded for calculations herein.

Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.

¹Concentrations in micrograms/cubic meters (µg/m³)

C_{indoor_corr} = C_{indoor} - C_{outdoor}

Exceedance Factors = Corrected indoor air concentration/IPIMAL

CCEF and NCEF values = cumulative total of individual EF values

CCEF = cancer cumulative exceedance factor

NCCEF = non-cancer cumulative exceedance factor

IPIMAL = inhalation pathway interim measure action level

C_{outdoor} = Concentration of compound in outdoor air sample

C_{indoor} = Concentration of compound in indoor air sample

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

Table 1
Summary of Indoor and Outdoor Air Sampling Results
5801 Third Avenue South (QC and Laser Office)
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	trans-1,2-dichloroethene					Vinyl Chloride					1,1-Dichloroethene					CCEF	NCCEF
		C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}		
5801 3rd Ave South (Capital QC and Laser Office)	4/13/2011	0.065	0.070	0.005	-	0.000	0.022	0.022	0.001	0.001	0.000	0.034	0.034	0.001	-	0.000	2	0
Commercial Indoor Air IPIMAL - Cancer ¹		-					0.66					--					10	10
Commercial Indoor Air IPIMAL - Non-cancer ¹		14					19					39						

NOTES:

Results in **bold** denote concentrations above the laboratory method reporting limit. Where concentrations are below the method reporting limit, a value one half of the method reporting limit is recorded for calculations herein.

Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.

¹Concentrations in micrograms/cubic meters (µg/m³)

$$C_{indoor_corr} = C_{indoor} - C_{outdoor}$$

Exceedance Factors = Corrected indoor air concentration/IPIMAL

CCEF and NCEF values = cumulative total of individual EF values

CCEF = cancer cumulative exceedance factor

NCCEF = non-cancer cumulative exceedance factor

IPIMAL = inhalation pathway interim measure action level

C_{outdoor} = Concentration of compound in outdoor air sample

C_{indoor} = Concentration of compound in indoor air sample

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

Table 1
Summary of Indoor and Outdoor Air Sampling Results
5801 3rd Avenue South (Shipping Office)
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	Tetrachloroethene					Trichloroethene					cis-1,2-dichloroethene					trans-1,2-dichloroethene					Vinyl Chloride					1,1-Dichloroethene					CCEF	NCCEF
		C _{outdoor} ¹	C _{indoor} ¹	C _{indoor corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor corr} ¹	EF _{Cancer}	EF _{Noncancer}		
5801 3rd Ave South (Capital Shipping Office)	4/13/2011	0.105	0.110	0.005	0.005	0.000	0.033	0.066	0.033	0.143	0.005	0.060	0.065	0.005	-	0.001	0.060	0.065	0.005	-	0.000	0.020	0.021	0.001	0.001	0.000	0.032	0.032	0.001	-	0.000	0.1	0.0
Commercial Indoor Air IPIMAL - Cancer ¹		0.97					0.23					-					-					0.66					--					10	10
Commercial Indoor Air IPIMAL - Non-cancer ¹		120					6.8					6.8					14					19					39						
<div>NOTES:</div> <div>Results in bold denote concentrations above the laboratory method reporting limit. Where concentrations are below the method reporting limit, a value one half of the method reporting limit is recorded for calculations herein.</div> <div>Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.</div> <div>¹Concentrations in micrograms/cubic meters (µg/m³)</div> <div>C_{indoor_corr} = C_{indoor} - C_{outdoor}</div> <div>Exceedance Factors = Corrected indoor air concentration/IPIMAL</div> <div>CCEF and NCEF values = cumulative total of individual EF values</div> <div>CCEF = cancer cumulative exceedance factor</div> <div>NCCEF = non-cancer cumulative exceedance factor</div> <div>IPIMAL = inhalation pathway interim measure action level</div> <div>C_{outdoor} = Concentration of compound in outdoor air sample</div> <div>C_{indoor} = Concentration of compound in indoor air sample</div> <div>EF_{Cancer} = Cancer exceedance factor</div> <div>EF_{Noncancer} = Noncancer exceedance factor</div>																																	

Table 4
Summary of Indoor and Outdoor Air Sample Cumulative Exceedance Factors
5807 4th Avenue South - Chinese Restaurant
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	Tetrachloroethene					Trichloroethene					cis-1,2-dichloroethene				
		C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} 1	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} 1	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}
IA-1	2/21/2012	0.11	0.36	0.250	0.258	0.002	0.085	0.09	0.005	0.022	0.001	0.065	0.650	0.585	-	0.086
IA-2	2/21/2012	0.11	0.56	0.450	0.464	0.004	0.085	0.09	0.005	0.022	0.001	0.065	0.065	0.000	-	0.000
Commercial Indoor Air IPIMAL - Cancer ¹		0.97					0.23					-				
Commercial Indoor Air IPIMAL - Non-cancer ¹		120					6.8					6.8				

NOTES:

Where concentrations are below the method reporting limit, a value one-half of the method reporting limit is recorded for calculations herein.

Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.

¹Concentrations in micrograms/cubic meter (µg/m3).

CCEF = cancer cumulative exceedance factor

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

Csoilgas = Concentration of compound in outdoor air sample

CCEF and NCEF values = cumulative total of individual EF values

Exceedance Factors = Corrected indoor air concentration/IPIMAL

IPIMAL = inhalation pathway interim measure action level

NCCEF = non-cancer cumulative exceedance factor

Table 4
Summary of Indoor and Outdoor Air Sample Cumulative Exceedance Factors
5807 4th Avenue South - Chinese Restaurant
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	trans-1,2-dichloroethene					Vinyl Chloride					1,1-Dichloroethene					CCEF	NCCEF
		C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr1}	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr1}	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr1}	EF _{Cancer}	EF _{Noncancer}		
IA-1	2/21/2012	0.320	0.335	0.015	-	0.001	0.020	0.021	0.001	0.002	0.000	0.032	0.034	0.002	-	0.000	0.3	0.1
IA-2	2/21/2012	0.320	0.335	0.015	-	0.001	0.020	0.021	0.001	0.002	0.000	0.032	0.034	0.002	-	0.000	0.5	0.0
Commercial Indoor Air IPIMAL - Cancer ¹		-					0.66					--					10	10
Commercial Indoor Air IPIMAL - Non-cancer ¹		14					19					39						

NOTES:

Where concentrations are below the method reporting limit, a value one-half of the method reporting limit is recorded for calculations herein.

Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.

¹Concentrations in micrograms/cubic meters (µg/m3)

CCEF = cancer cumulative exceedance factor

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

Csoilgas = Concentration of compound in outdoor air sample

CCEF and NCEF values = cumulative total of individual EF values

Exceedance Factors = Corrected indoor air concentration/IPIMAL

IPIMAL = inhalation pathway interim measure action level

NCCEF = non-cancer cumulative exceedance factor

Table 4
Summary of Sub-Slab Soil Gas Sample Cumulative Exceedance Factors
5815 4th Avenue South - North Building
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations ^{1,2}	Sample Date	Tetrachloroethene			Trichloroethene			cis-1,2-dichloroethene			trans-1,2-dichloroethene			Vinyl Chloride			1,1-Dichloroethene			CCEF ¹	NCCEF ²
		C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}		
SS-2 5815N-Warehouse1-041311	4/13/2011	840	86.60	0.70	1,400	608.70	20.59	74	-	1.09	0.7	-	0.005	0.22	0.033	0.001	0.34	-	0.0009	695	22
SS-3 5815N-Warehouse2-041311	4/13/2011	4,200	432.99	3.50	28,000	12,173.91	411.76	21	-	0.31	21	-	0.15	13.5	2.05	0.071	21	-	0.054	12,609	416
Commercial Sub-Slab Soil Gas IPIMAL - Cancer ³		9.7			2.3			-			-			6.6			--			10	10
Commercial Sub-Slab Soil Gas IPIMAL - Non-cancer ³		1,200			68			68			140			190			390				

NOTES:

Where concentrations are below the method reporting limit, a value one-half of the method reporting limit is recorded for calculations herein.

¹Locations with a CCEF exceeding 10 are presented in bold and indicate that they are proposed for further evaluation. These buildings have a potential vapor intrusion risk due to a cumulative inhalation cancer risk of greater than 1E-05.

²Locations with a NCCEF exceeding 10 are presented in bold and indicate that they are proposed for further evaluation. These buildings have a potential vapor intrusion risk due to a cumulative noncancer hazard index greater than 1.

³Concentrations in micrograms/cubic meter (µg/m³).

CCEF = cancer cumulative exceedance factor

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

Csoilgas = Concentration of compound in sub-slab soil gas sample

CCEF and NCEF values = cumulative total of individual EF values

IPIMAL = inhalation pathway interim measure action level

NCCEF = non-cancer cumulative exceedance factor

Table 5
Summary of Indoor and Outdoor Air Sample Cumulative Exceedance Factors
5815 4th Avenue South - North Building
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	Tetrachloroethene					Trichloroethene					cis-1,2-dichloroethene				
		C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}
IA-3	2/21/2012	0.11	1.50	1.39	1.43	0.012	0.085	4.40	4.32	18.76	0.63	0.065	0.98	0.92	-	0.13
IA-4	2/21/2012	0.11	0.60	0.49	0.51	0.004	0.085	1.90	1.82	7.89	0.27	0.065	0.32	0.26	-	0.04
Commercial Indoor Air IPIMAL - Cancer ³		0.97					0.23					-				
Commercial Indoor Air IPIMAL - Non-cancer ³		120					6.8					6.8				

NOTES:

Where concentrations are below the method reporting limit, a value one-half of the method reporting limit is recorded for calculations herein.

Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.

¹Samples with a CCEF exceeding 10 are presented in *bold* and indicate a potential cumulative inhalation cancer risk due to vapor intrusion greater than 1E-05.

²Samples with a NCCEF exceeding 10 are presented in *bold* and indicate a potential cumulative risk due to vapor intrusion with a hazard index greater than 1.

³Concentrations in micrograms/cubic meter (µg/m³)

CCEF = cancer cumulative exceedance factor

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

C_{outdoor} = Concentration of compound in outdoor air sample

C_{indoor} = Concentration of compound in indoor air sample

C_{indoor_corr} = C_{indoor} - C_{outdoor}

CCEF and NCEF values = cumulative total of individual EF values

Exceedance Factors = Corrected indoor air concentration/IPIMAL

IPIMAL = inhalation pathway interim measure action level

NCCEF = non-cancer cumulative exceedance factor

Table 5
Summary of Indoor and Outdoor Air Sample Cumulative Exceedance Factors
5815 4th Avenue South - North Building
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	trans-1,2-dichloroethene					Vinyl Chloride					1,1-Dichloroethene					CCEF ¹	NCCEF ²
		C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}		
IA-3	2/21/2012	0.32	0.34	0.02	-	0.001	0.020	0.022	0.002	0.002	0.0001	0.032	0.034	0.002	-	0.00004	20.2	0.8
IA-4	2/21/2012	0.32	0.34	0.02	-	0.001	0.020	0.022	0.002	0.003	0.0001	0.032	0.034	0.002	-	0.0001	8.4	0.3
Commercial Indoor Air IPIMAL - Cancer ³		-					0.66					--					10	10
Commercial Indoor Air IPIMAL - Non-cancer ³		14					19					39						

NOTES:

Where concentrations are below the method reporting limit, a value one-half of the method reporting limit is recorded for calculations herein.

Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.

¹Samples with a CCEF exceeding 10 are presented in **bold** and indicate a potential cumulative inhalation cancer risk due to vapor intrusion greater than 1E-05.

²Samples with a NCCEF exceeding 10 are presented in **bold** and indicate a potential cumulative risk due to vapor intrusion with a hazard index greater than 1.

³Concentrations in micrograms/cubic meter (µg/m³)

CCEF = cancer cumulative exceedance factor

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

C_{outdoor} = Concentration of compound in outdoor air sample

C_{indoor} = Concentration of compound in indoor air sample

C_{indoor_corr} = C_{indoor} - C_{outdoor}

CCEF and NCEF values = cumulative total of individual EF values

Exceedance Factors = Corrected indoor air concentration/IPIMAL

IPIMAL = inhalation pathway interim measure action level

NCCEF = non-cancer cumulative exceedance factor

Table 4
Summary of Sub-Slab Soil Gas Sample Cumulative Exceedance Factors
5815 4th Avenue South - South Building
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations ^{1,2}	Sample Date	Tetrachloroethene			Trichloroethene			cis-1,2-dichloroethene			trans-1,2-dichloroethene			Vinyl Chloride			1,1-Dichloroethene			CCEF ¹	NCCEF ²
		C _{soilgas}	EF _{Cancer}	EF _{Noncancer}	C _{soilgas}	EF _{Cancer}	EF _{Noncancer}	C _{soilgas}	EF _{Cancer}	EF _{Noncancer}	C _{soilgas}	EF _{Cancer}	EF _{Noncancer}	C _{soilgas}	EF _{Cancer}	EF _{Noncancer}	C _{soilgas}	EF _{Cancer}	EF _{Noncancer}		
SS-4	2/24/2012	1,300	134.02	1.08	1,400	608.70	20.59	1.80	-	0.026	1.8	-	0.013	1.15	0.17	0.0061	1.80	-	0.0046	742.89	21.72
SS-5	2/24/2012	15	1.55	0.01	95	41.30	1.40	0.36	-	0.005	0.36	-	0.003	0.24	0.04	0.0012	0.36	-	0.0009	42.89	1.42
Commercial Sub-Slab Soil Gas IPIMAL - Cancer ³		9.7			2.3			-			-			6.6			--			10	10
Commercial Sub-Slab Soil Gas IPIMAL - Non-cancer ³		1,200			68			68			140			190			390				

NOTES:
Where concentrations are below the method reporting limit, a value one-half of the method reporting limit is recorded for calculations herein.
¹Locations with a CCEF exceeding 10 are presented in bold and indicate that they are proposed for further evaluation. These buildings have a potential vapor intrusion risk due to a cumulative inhalation cancer risk of greater than 1E-05.
²Locations with a NCCEF exceeding 10 are presented in bold and indicate that they are proposed for further evaluation. These buildings have a potential vapor intrusion risk due to a cumulative noncancer hazard index greater than 1.
³Concentrations in micrograms/cubic meter (µg/m³)

CCEF = cancer cumulative exceedance factor
EF_{Cancer} = Cancer exceedance factor
EF_{Noncancer} = Noncancer exceedance factor
C_{soilgas} = Concentration of compound in sub-slab soil gas sample
CCEF and NCEF values = cumulative total of individual EF values
Exceedance Factors = Corrected indoor air concentration/IPIMAL
IPIMAL = inhalation pathway interim measure action level
NCCEF = non-cancer cumulative exceedance factor

Table 5
Summary of Indoor and Outdoor Air Sample Cumulative Exceedance Factors
5815 4th Avenue South - South Building
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	Tetrachloroethene					Trichloroethene					cis-1,2-dichloroethene				
		C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}
IA-5	2/21/2012	0.11	0.75	0.640	0.660	0.005	0.085	0.42	0.335	1.457	0.049	0.065	0.065	0.000	-	0.000
IA-6	2/21/2012	0.11	0.92	0.810	0.835	0.007	0.085	0.57	0.485	2.109	0.071	0.065	0.065	0.000	-	0.000
Commercial Indoor Air IPIMAL - Cancer ¹		0.97					0.23					-				
Commercial Indoor Air IPIMAL - Non-cancer ¹		120					6.8					6.8				

NOTES:

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CCEF and NCEF values = cumulative total of individual EF values

Exceedance Factors = Corrected indoor air concentration/IPIMAL

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NCCEF = non-cancer cumulative exceedance factor

Table 5
Summary of Indoor and Outdoor Air Sample Cumulative Exceedance Factors
5815 4th Avenue South - South Building
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	trans-1,2-dichloroethene					Vinyl Chloride					1,1-Dichloroethene					CCEF	NCCEF
		C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}		
IA-5	2/21/2012	0.320	0.335	0.015	-	0.001	0.020	0.021	0.001	0.002	0.0001	0.032	0.033	0.001	-	0.00001	2.1	0.1
IA-6	2/21/2012	0.320	0.335	0.015	-	0.001	0.020	0.021	0.001	0.002	0.0001	0.032	0.033	0.001	-	0.00001	2.9	0.1
Commercial Indoor Air IPIMAL - Cancer ¹		-					0.66					--					10	10
Commercial Indoor Air IPIMAL - Non-cancer ¹		14					19					39						

NOTES:

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Exceedance Factors = Corrected indoor air concentration/IPIMAL

IPIMAL = inhalation pathway interim measure action level

NCCEF = non-cancer cumulative exceedance factor

Table 1
Summary of Indoor and Outdoor Air Sampling Results
5914 4th Avenue South (Mobile Crane)
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	Tetrachloroethene					Trichloroethene					cis-1,2-dichloroethene				
		C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}
5914 4th Ave South (Mobile Crane)	4/13/2011	0.115	0.120	0.005	0.005	0.000	0.036	2.00	1.964	8.539	0.289	0.070	0.070	0.000	-	0.000
Commercial Indoor Air IPIMAL - Cancer ¹		0.97					0.23					-				
Commercial Indoor Air IPIMAL - Non-cancer ¹		120					6.8					6.8				

NOTES:

Results in **bold** denote concentrations above the laboratory method reporting limit. Where concentrations are below the method reporting limit, a value one half of the method reporting limit is recorded for calculations herein.

Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.

¹Concentrations in micrograms/cubic meters (µg/m³)

C_{indoor_corr} = C_{indoor} - C_{outdoor}

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CCEF and NCEF values = cumulative total of individual EF values

CCEF = cancer cumulative exceedance factor

NCCEF = non-cancer cumulative exceedance factor

IPIMAL = inhalation pathway interim measure action level

C_{outdoor} = Concentration of compound in outdoor air sample

C_{indoor} = Concentration of compound in indoor air sample

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

Table 1
Summary of Indoor and Outdoor Air Sampling Results
5914 4th Avenue South (Mobile Crane)
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	trans-1,2-dichloroethene					Vinyl Chloride					1,1-Dichloroethene					CCEF	NCCEF
		C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ¹	C _{indoor} ¹	C _{indoor_corr} ¹	EF _{Cancer}	EF _{Noncancer}		
5914 4th Ave South (Mobile Crane)	4/13/2011	0.070	0.070	0.000	-	0.000	0.022	0.023	0.001	0.001	0.000	0.034	0.035	0.001	-	0.000	9	0
Commercial Indoor Air IPIMAL - Cancer ¹		-					0.66					--					10	10
Commercial Indoor Air IPIMAL - Non-cancer ¹		14					19					39						

NOTES:

Results in **bold** denote concentrations above the laboratory method reporting limit. Where concentrations are below the method reporting limit, a value one half of the method reporting limit is recorded for calculations herein.

Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.

¹Concentrations in micrograms/cubic meters (µg/m³)

C_{indoor_corr} = C_{indoor} - C_{outdoor}

Exceedance Factors = Corrected indoor air concentration/IPIMAL

CCEF and NCEF values = cumulative total of individual EF values

CCEF = cancer cumulative exceedance factor

NCCEF = non-cancer cumulative exceedance factor

IPIMAL = inhalation pathway interim measure action level

C_{outdoor} = Concentration of compound in outdoor air sample

C_{indoor} = Concentration of compound in indoor air sample

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

Table 3
Summary of Sub-Slab Sampling Results
Capital Industries
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations ^{1,2}	Sample Date	Tetrachloroethene			Trichloroethene			cis-1,2-dichloroethene			trans-1,2-dichloroethene			Vinyl Chloride			1,1-Dichloroethene			CCEF ¹	NCCEF ²
		C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}		
5930 1st Ave South (Beckwith & Kuffel) Subslab1 Sample	4/14/2011	14	1.443	0.0117	1.6	0.696	0.024	0.06	-	0.001	0.06	-	0.000	0.019	0.003	0.0001	0.0295	-	0.0001	2.14	0.04
5930 1st Ave South (Beckwith & Kuffel) Subslab2 Sample	4/14/2011	1.5	0.155	0.0013	0.33	0.143	0.005	0.06	-	0.001	0.06	-	0.000	0.019	0.003	0.0001	1	-	0.0026	0.30	0.01
5815 4th Ave South (Pacific Food Systems North Building) Warehouse1 sample	4/13/2011	840	86.598	0.7000	1,400	608.696	20.588	74	-	1.088	0.7	-	0.005	0.22	0.033	0.0012	0.34	-	0.0009	695.33	22.38
5815 4th Ave South (Pacific Food Systems North Building) Warehouse2 sample	4/13/2011	4,200	432.990	3.5000	28,000	12,173.913	411.765	21	-	0.309	21	-	0.150	13.5	2.045	0.0711	21	-	0.0538	12,608.95	415.85
Commercial Sub-Slab Soil Gas IPIMAL (µg/m ³) - Cancer		9.7			2.3			-			-			6.6			--				
Commercial Sub-Slab Soil Gas IPIMAL (µg/m ³) - Non-cancer		1,200			68			68			140			190			390				

NOTES:

¹Locations with a CCEF exceeding 100 are presented in bold and indicate that they are proposed for further evaluation under Tier 4 of the IPIM approach (Table 1). These buildings have a potential cumulative inhalation cancer risk due to vapor intrusion of 1E-05 or greater.

²Locations with a NCCEF exceeding 100 are presented in bold and indicate that they are proposed for further evaluation under Tier 4 of the IPIM approach (Table 1). These building have a potential cumulative inhalation cancer risk due to vapor intrusion of 1 or greater.

³Concentrations in µg/m³

CCEF = cancer cumulative exceedance factor

IPIM = inhalation pathway interim measure

NCCEF = non-cancer cumulative exceedance factor

µg/m³=micrograms/meters³

Table 2
Summary of Sub-Slab Soil Gas Samples Results
5930 1st Avenue South (Beckwith and Kuffel)
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations ^{1,2}	Sample Date	Tetrachloroethene			Trichloroethene			cis-1,2-dichloroethene			trans-1,2-dichloroethene			Vinyl Chloride			1,1-Dichloroethene			CCEF ¹	NCCEF ²
		C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}		
5930 1st Ave South (Beckwith & Kuffel) Subslab1 Sample	4/14/2011	14	1.443	0.0117	1.6	0.696	0.024	0.06	-	0.001	0.06	-	0.000	0.019	0.003	0.0001	0.0295	-	0.0001	2.14	0.04
5930 1st Ave South (Beckwith & Kuffel) Subslab2 Sample	4/14/2011	1.5	0.155	0.0013	0.33	0.143	0.005	0.06	-	0.001	0.06	-	0.000	0.019	0.003	0.0001	1.0	-	0.0026	0.30	0.01
Commercial Sub-Slab Soil Gas IPIMAL - Cancer ³		9.7			2.3			-			-			6.6			--				
Commercial Sub-Slab Soil Gas IPIMAL - Non-cancer ³		1,200			68			68			140			190			390			10	10

NOTES:
Results in **bold** denote concentrations above the laboratory method reporting limit. Where concentrations are below the method reporting limit, a value one half of the method reporting limit is recorded for calculations herein.
Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.
¹Locations with a CCEF exceeding 10 are presented in **bold** and indicate that they are proposed for further evaluation under Tier 4 of the IPIM approach (Table 1). These buildings have a potential cumulative inhalation cancer risk due to vapor intrusion of 1E-05 or greater.
²Locations with a NCCEF exceeding 10 are presented in **bold** and indicate that they are proposed for further evaluation under Tier 4 of the IPIM approach (Table 1). These building have a potential cumulative inhalation cancer risk due to vapor intrusion of 1 or greater.
³Concentrations in micrograms/cubic meters (µg/m³)
 $C_{indoor,cor} = C_{indoor} - C_{outdoor}$
Exceedance Factors = Corrected indoor air concentration/IPIMAL
CCEF and NCEF values = cumulative total of individual EF values

CCEF = cancer cumulative exceedance factor
NCCEF = non-cancer cumulative exceedance factor
IPIMAL = inhalation pathway interim measure action level
 $C_{outdoor}$ = Concentration of compound in outdoor air sample
 C_{indoor} = Concentration of compound in indoor air sample
EF_{Cancer} = Cancer exceedance factor
EF_{Noncancer} = Noncancer exceedance factor

NOTES:
Results in **bold** denote concentrations above the laboratory method reporting limit. Where concentrations are below the method reporting limit, a value one half of the method reporting limit is recorded for calculations herein.
Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.
¹Locations with a CCEF exceeding 10 are presented in **bold** and indicate that they are proposed for further evaluation under Tier 4 of the IPIM approach (Table 1). These buildings have a potential cumulative inhalation cancer risk due to vapor intrusion of 1E-05 or greater.
²Locations with a NCCEF exceeding 10 are presented in **bold** and indicate that they are proposed for further evaluation under Tier 4 of the IPIM approach (Table 1). These building have a potential cumulative inhalation cancer risk due to vapor intrusion of 1 or greater.
³Concentrations in micrograms/cubic meters (µg/m³)
 $C_{indoor,cor} = C_{indoor} - C_{outdoor}$
Exceedance Factors = Corrected indoor air concentration/IPIMAL
CCEF and NCEF values = cumulative total of individual EF values

CCEF = cancer cumulative exceedance factor
NCCEF = non-cancer cumulative exceedance factor
IPIMAL = inhalation pathway interim measure action level
 $C_{outdoor}$ = Concentration of compound in outdoor air sample
 C_{indoor} = Concentration of compound in indoor air sample
EF_{Cancer} = Cancer exceedance factor
EF_{Noncancer} = Noncancer exceedance factor

Table 3
Summary of Indoor and Outdoor Air Samples Results
5930 1st Avenue South (Beckwith and Kuffel)
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	Tetrachloroethene					Trichloroethene					cis-1,2-dichloroethene				
		C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}
5930 1st. Ave South (Beckwith & Kuffel) Office1 Sample	4/13/2011	0.110	14.00	13.890	14.320	0.116	0.059	0.070	0.011	0.048	0.002	0.065	0.060	-0.005	-	-0.001
5930 1st. Ave South (Beckwith & Kuffel) Office2 Sample	4/13/2011	0.110	13.00	12.890	13.289	0.107	0.059	0.064	0.005	0.022	0.001	0.065	0.070	0.005	-	0.001
Commercial Indoor Air IPIMAL - Cancer ³		0.97					0.23					-				
Commercial Indoor Air IPIMAL - Non-cancer ³		120					6.8					6.8				

NOTES:

Results in **bold** denote concentrations above the laboratory method reporting limit. Where concentrations are below the method reporting limit, a value one half of the method reporting limit is recorded for calculations herein.

Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.

¹Samples with a CCEF exceeding 10 are presented in **bold** and indicate a potential cumulative inhalation cancer risk due to vapor intrusion greater than 1E-05.

²Samples with a NCCEF exceeding 10 are presented in **bold** and indicate a potential cumulative risk due to vapor intrusion with a hazard quotient greater than 1.

³Concentrations in micrograms/cubic meters (µg/m³)

$$C_{\text{indoor_corr}} = C_{\text{indoor}} - C_{\text{outdoor}}$$

Exceedance Factors = Corrected indoor air concentration/IPIMAL

CCEF and NCEF values = cumulative total of individual EF values

CCEF = cancer cumulative exceedance factor

NCCEF = non-cancer cumulative exceedance factor

IPIMAL = inhalation pathway interim measure action level

C_{outdoor} = Concentration of compound in outdoor air sample

C_{indoor} = Concentration of compound in indoor air sample

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

Table 3
Summary of Indoor and Outdoor Air Samples Results
5930 1st Avenue South (Beckwith and Kuffel)
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	trans-1,2-dichloroethene					Vinyl Chloride					1,1-Dichloroethene					CCEF ¹	NCCEF ²
		C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}		
5930 1st. Ave South (Beckwith & Kuffel) Office1 Sample	4/13/2011	0.065	0.060	-0.005	-	0.000	0.021	0.020	-0.001	-0.002	0.000	0.032	0.030	-0.002	-	0.000	14	0
5930 1st. Ave South (Beckwith & Kuffel) Office2 Sample	4/13/2011	0.065	0.070	0.005	-	0.000	0.021	0.023	0.002	0.003	0.000	0.032	0.035	0.003	-	0.000	13	0
Commercial Indoor Air IPIMAL - Cancer ³		-					0.66					--					10	10
Commercial Indoor Air IPIMAL - Non-cancer ³		14					19					39						

NOTES:

Results in **bold** denote concentrations above the laboratory method reporting limit. Where concentrations are below the method reporting limit, a value one half of the method reporting limit is recorded for calculations herein.

Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.

¹Samples with a CCEF exceeding 10 are presented in **bold** and indicate a potential cumulative inhalation cancer risk due to vapor intrusion greater than 1E-05.

²Samples with a NCCEF exceeding 10 are presented in **bold** and indicate a potential cumulative risk due to vapor intrusion with a hazard quotient greater than 1.

³Concentrations in micrograms/cubic meters (µg/m³)

$$C_{\text{indoor_corr}} = C_{\text{indoor}} - C_{\text{outdoor}}$$

Exceedance Factors = Corrected indoor air concentration/IPIMAL

CCEF and NCEF values = cumulative total of individual EF values

CCEF = cancer cumulative exceedance factor

NCCEF = non-cancer cumulative exceedance factor

IPIMAL = inhalation pathway interim measure action level

C_{outdoor} = Concentration of compound in outdoor air sample

C_{indoor} = Concentration of compound in indoor air sample

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

Table 4
Summary of Sub-Slab Soil Gas Sample Cumulative Exceedance Factors
5901 4th Avenue South - Gull Industries Building
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations ^{1,2}	Sample Date	Tetrachloroethene			Trichloroethene			cis-1,2-dichloroethene			trans-1,2-dichloroethene			Vinyl Chloride			1,1-Dichloroethene			CCEF ¹	NCCEF ²
		C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}	C _{soilgas} ³	EF _{Cancer}	EF _{Noncancer}		
Gull Industries SS-1	1/29/2012	2,700	278.351	2.2500	380	165.217	5.588	2.75	-	0.040	2.75	-	0.020	1.75	0.265	0.0092	2.75	-	0.0071	443.83	7.91
Gull Industries SS-2	1/29/2012	2,700	278.351	2.2500	4,100	1,782.609	60.294	4.05	-	0.060	4.05	-	0.029	2.60	0.394	0.0137	4.05	-	0.0104	2,061.35	62.66
Commercial Sub-Slab Soil Gas IPIMAL - Cancer ³		9.7			2.3			-			-			6.6			--			10	10
Commercial Sub-Slab Soil Gas IPIMAL - Non-cancer ³		1,200			68			68			140			190			390				

NOTES:

Where concentrations are below the method reporting limit, a value one-half of the method reporting limit is recorded for calculations herein.

Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.

¹Locations with a CCEF exceeding 10 are presented in bold and indicate that they are proposed for further evaluation under Tier 4 of the IPIM approach (Table 1). These buildings have a potential cumulative inhalation cancer risk due to vapor intrusion of 1E-05 or greater.

²Locations with a NCCEF exceeding 10 are presented in bold and indicate that they are proposed for further evaluation under Tier 4 of the IPIM approach (Table 1). These building have a potential cumulative inhalation cancer risk due to vapor intrusion of 1 or greater.

³Concentrations in micrograms/cubic meter (µg/m³)

CCEF = cancer cumulative exceedance factor

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

C_{outdoor} = Concentration of compound in outdoor air sample

C_{indoor} = Concentration of compound in indoor air sample

C_{indoor_corr} = C_{indoor} - C_{outdoor}

CCEF and NCEF values = cumulative total of individual EF values

Exceedance Factors = Corrected indoor air concentration/IPIMAL

IPIMAL = inhalation pathway interim measure action level

NCCEF = non-cancer cumulative exceedance factor

Table 5
Summary of Indoor and Outdoor Air Sample Cumulative Exceedance Factors
5901 4th Avenue South - Gull Industries Building
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	Tetrachloroethene					Trichloroethene					cis-1,2-dichloroethene				
		C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}
Gull Industries IA-1	1/28/2012	0.085	0.55	0.465	0.479	0.004	0.075	1.400	1.325	5.761	0.195	0.055	0.060	0.005	-	0.001
Gull Industries IA-2	1/28/2012	0.085	0.46	0.375	0.387	0.003	0.075	0.200	0.125	0.543	0.018	0.055	0.060	0.005	-	0.001
Gull Industries IA-3	1/28/2012	0.085	0.050	-0.035	-0.036	0.000	0.075	0.380	0.305	1.326	0.045	0.055	0.060	0.005	-	0.001
Commercial Indoor Air IPIMAL - Cancer ³		0.97					0.23					-				
Commercial Indoor Air IPIMAL - Non-cancer ³		120					6.8					6.8				

NOTES:

Where concentrations are below the method reporting limit, a value one-half of the method reporting limit is recorded for calculations herein.

Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.

¹Samples with a CCEF exceeding 10 are presented in *bold* and indicate a potential cumulative inhalation cancer risk due to vapor intrusion greater than 1E-05.

²Samples with a NCCEF exceeding 10 are presented in *bold* and indicate a potential cumulative risk due to vapor intrusion with a hazard quotient greater than 1.

³Concentrations in micrograms/cubic meter (µg/m³)

CCEF = cancer cumulative exceedance factor

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

C_{outdoor} = Concentration of compound in outdoor air sample. One-half the Laboratory Reporting Limit was used due to compromised sample results.

C_{indoor} = Concentration of compound in indoor air sample

C_{indoor_corr} = C_{indoor} - C_{outdoor}

CCEF and NCEF values = cumulative total of individual EF values

Exceedance Factors = Corrected indoor air concentration/IPIMAL

IPIMAL = inhalation pathway interim measure action level

NCCEF = non-cancer cumulative exceedance factor

Table 5
Summary of Indoor and Outdoor Air Sample Cumulative Exceedance Factors
5901 4th Avenue South - Gull Industries Building
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Indoor Air Sampling Locations	Sample Date	trans-1,2-dichloroethene					Vinyl Chloride					1,1-Dichloroethene					CCEF ¹	NCCEF ²
		C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}	C _{outdoor} ³	C _{indoor} ³	C _{indoor_corr} ³	EF _{Cancer}	EF _{Noncancer}		
Gull Industries IA-1	1/28/2012	0.028	0.305	0.278	-	0.020	0.018	0.020	0.002	0.002	0.000	0.028	0.031	0.003	-	0.000	6	0
Gull Industries IA-2	1/28/2012	0.028	0.315	0.288	-	0.021	0.018	0.020	0.002	0.003	0.000	0.028	0.032	0.004	-	0.000	1	0
Gull Industries IA-3	1/28/2012	0.028	0.310	0.283	-	0.020	0.018	0.020	0.002	0.003	0.000	0.028	0.031	0.004	-	0.000	1	0
Commercial Indoor Air IPIMAL - Cancer ³		-					0.66					--					10	10
Commercial Indoor Air IPIMAL - Non-cancer ³		14					19					39						

NOTES:

Where concentrations are below the method reporting limit, a value one-half of the method reporting limit is recorded for calculations herein.

Where outdoor air concentrations exceed indoor air concentrations, this results in negative corrected concentrations. These are included in the CCEF and NCCEF totals.

¹Samples with a CCEF exceeding 10 are presented in **bold** and indicate a potential cumulative inhalation cancer risk due to vapor intrusion greater than 1E-05.

²Samples with a NCCEF exceeding 10 are presented in **bold** and indicate a potential cumulative risk due to vapor intrusion with a hazard quotient greater than 1.

³Concentrations in micrograms/cubic meters (µg/m³)

CCEF = cancer cumulative exceedance factor

EF_{Cancer} = Cancer exceedance factor

EF_{Noncancer} = Noncancer exceedance factor

C_{outdoor} = Concentration of compound in outdoor air sample. One-half the Laboratory Reporting Limit was used due to compromised sample results.

C_{indoor} = Concentration of compound in indoor air sample

C_{indoor_corr} = C_{indoor} - C_{outdoor}

CCEF and NCEF values = cumulative total of individual EF values

Exceedance Factors = Corrected indoor air concentration/IPIMAL

IPIMAL = inhalation pathway interim measure action level

NCCEF = non-cancer cumulative exceedance factor

**APPENDIX G
SIDE SEWER CARDS**

REVISED DRAFT
REMEDIAL INVESTIGATION REPORT

Capital Industries, Inc.
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-004

4130

City of Seattle
4130
11/29/0

S. FIDALGO ST.

Rubber Gasket Pipe Only

See card # 4944

P. 11 1-7-93

Commercial Street Steam Motor Add. 3-85

Ave. S.

2nd Ave. S.

1st.

Under Construction 1937

Gov't Lot 3, Sec 20-24-4

5900

HCSP 9404628

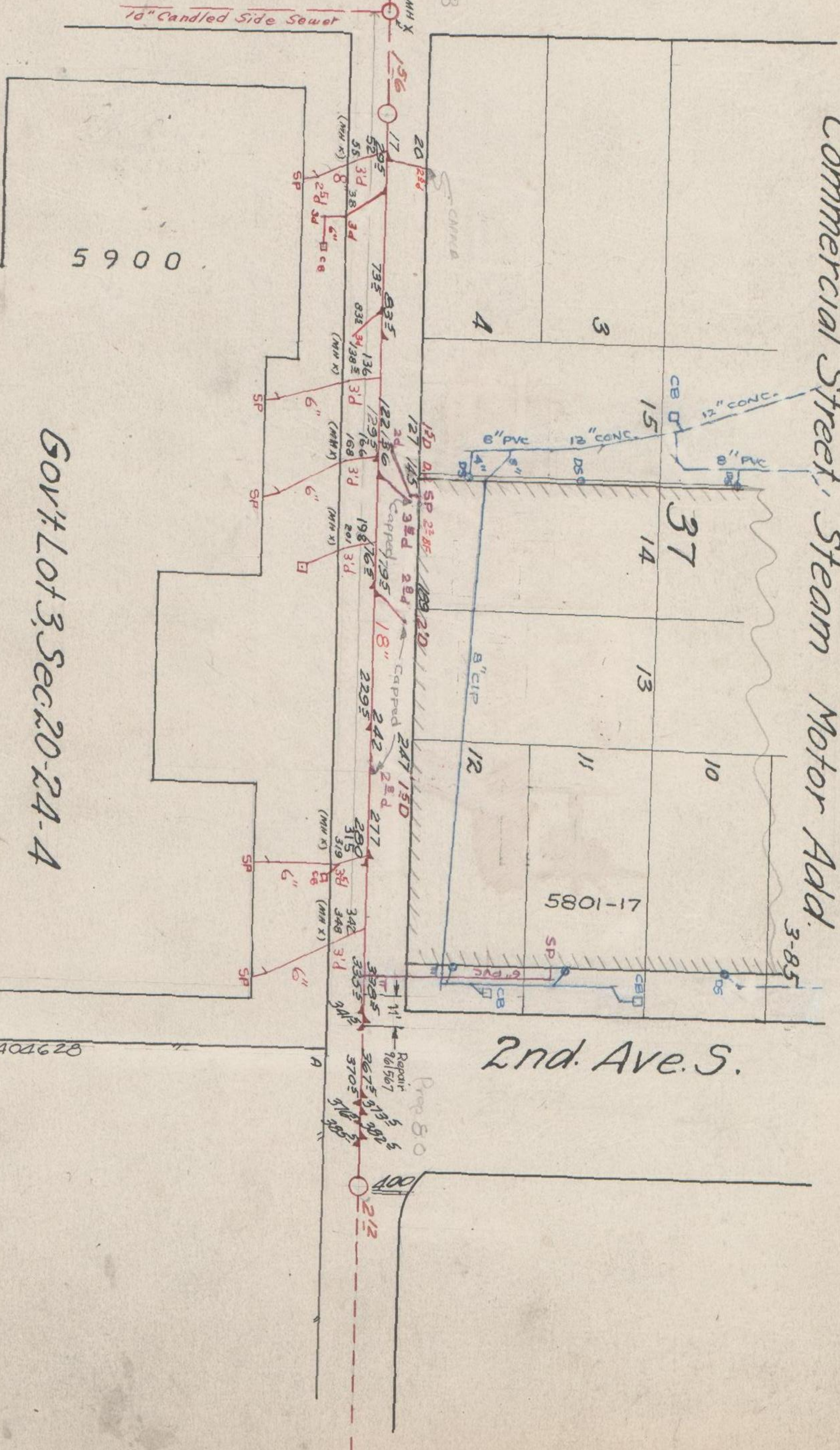
VAC. ORD.
89341

I.D. 3588 BOOK

Pg.

NOV 9 1926

WDC
plan in file
See 1st Ave S. card.
12-16-91





City of Seattle 4132 11/29/00

4132

Pull 1-7-93

5

S. FIDALGO ST.

Rubber Gasket Pipe Only

Commercial Street Steam Motor Add. 3-8

ADDITION TO
5801 3RD AVE. S.

3rd Ave. S.
(VACATED)

SEE CARD #4946
4131
4945

4th Ave. S.

SEE CARD 4131
4945
4946

5801
10
12
320
5815

SEE CARD #4131

GOV'T. LOT 3 SEC 23244

5901-13
ADDITION

1. D 3225 BOOK

PG. site Board for Comm College to 5801 3rd Ave S 1-14-73 Donald J. ...

KCSP 9A00G28

NOV 9 1926

See Card 4131-12

See card

See Card 4133

See Card 4133

GR 670/478
C. BRUNING CO. 9-1-19

R.D. 571-1079
C. Bruning Co. 9-1-19

See 941-12-A
4133

APPENDIX H
BIOCHLOR TWO-DIMENSIONAL MODELING DATA

REVISED DRAFT
REMEDIAL INVESTIGATION REPORT

Capital Industries, Inc.
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-004

Table 15
Fate and Transport Modeling Input Parameters
Remedial Investigation Report
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Model Parameter	Units	Data Source	Water Table Zone	Shallow Zone	Intermediate Zone
Hydraulic Gradient	foot per foot	Remedial Investigation	0.0017	0.0016	0.0016
Hydraulic Conductivity	cm/s	Aquifer Slug tests	1.13E-02	9.99E-03	2.13E-03
Effective Porosity	--	Nominal Value	0.25	0.25	0.25
Dispersivity	--				
Longitudinal (α_x)		Xu & Eckstein	31.2	31.2	31.2
Transverse (α_y)		(α_x) * 0.1	3.1	3.1	3.1
Vertical (α_z)		No Vertical Dispersion	1.0E-99	1.0E-99	1.0E-99
Plume length for estimation	feet		1730	1730	1730
Soil Bulk Density	kg/L	MTCA Common Assumption	1.51	1.51	1.51
Soil Fraction Organic Carbon (foc)	per cent	Soil Measurements	0.2	0.22	0.25
<i>Koc</i>					
PCE	L/kg	MTCA CLARC tables	265	265	265
TCE	L/kg	MTCA CLARC tables	94	94	94
cis-1,2 DCE	L/kg	MTCA CLARC tables	35.5	35.5	35.5
VC	L/kg	MTCA CLARC tables	19	19	19
Source Area Dimensions					
Width	feet	Remedial Investigation	50	50	50
Height	feet	Remedial Investigation	20	20	20
<i>Biodegradation Rates (half life)</i>					
PCE	years	Literature Value (Newell 25 th percentile)	1.2	1.2	1.2
TCE	years	Literature Value (Newell 25 th percentile)	1.8	1.8	1.8
cis-1,2 DCE	years	Literature Value (Newell 25 th percentile)	1.6	1.6	1.6
VC	years	Literature Value (Newell 25 th percentile)	1.7	1.7	1.7

Table 15
Fate and Transport Modeling Input Parameters
Remedial Investigation Report
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Model Parameter	Units	Data Source	Water Table Zone	Shallow Zone	Intermediate Zone
Source Area Concentrations					
1 Centerline "Source" Well(s)			CI-12-WT; CI-14-WT	CI-12-30; CI-14-35	CI-15-60
PCE	ug/L	Average Concentration over RI Period	0.2 U	0.4 U	0.4 U
		Maximum Concentration over RI Period	0.2 U	0.4 U	0.4 U
TCE	ug/L	Average Concentration over RI Period	1.1	67.2	0.4 U
		Maximum Concentration over RI Period	1.7	83	0.4 U
cis-1,2 DCE	ug/L	Average Concentration over RI Period	14.2	26.2	0.4 U
		Maximum Concentration over RI Period	48	33	0.4 U
VC	ug/L	Average Concentration over RI Period	2.5	19.2	103
		Maximum Concentration over RI Period	10	28	140
2 Centerline "Source" Well(s)			CI-10-WT	CG-141-40	NA
PCE	ug/L	Average Concentration over RI Period	0.2 U	1 U	
		Maximum Concentration over RI Period	0.2 U	1 U	
TCE	ug/L	Average Concentration over RI Period	49.1	1 U	
		Maximum Concentration over RI Period	87	1 U	
cis-1,2 DCE	ug/L	Average Concentration over RI Period	22.4	1 U	
		Maximum Concentration over RI Period	35	1 U	
VC	ug/L	Average Concentration over RI Period	0.21	213.3	
		Maximum Concentration over RI Period	0.21	270	
3 Centerline "Source" Well(s)			MW-5; MW-6; BDC-6-WT	NA	NA
PCE	ug/L	Average Concentration over RI Period	8.7		
		Maximum Concentration over RI Period	11		
TCE	ug/L	Average Concentration over RI Period	170		
		Maximum Concentration over RI Period	230		
cis-1,2 DCE	ug/L	Average Concentration over RI Period	91.4		
		Maximum Concentration over RI Period	130		
VC	ug/L	Average Concentration over RI Period	9.7		
		Maximum Concentration over RI Period	20		
Source Type	--	Assumed	Continuous*	Continuous*	Continuous
Simulation Time	years	Nominal Value	500	500	500

NOTES:

Biodegradation rates from Figure 5 of Newell, C. et al, 2002. Calculation and Use of First Order Rate Constants for EPA Studies. November.

Some source areas represented using multiple wells at approximately the same distance from Duwamish to represent maximum COC concentration (PCE, TCE, etc.) at that location.

Hydraulic conductivity values discussed in Remedial Investigation Report. Geometric mean of slug test values for each zone used for modeling.

* Decaying source used for some alternate simulations in the Water Table Zone (Source 2) and Shallow Zone (Source 1)

CLARC = Cleanup Levels and Risk Calculations

cm/s = centimeters per second

COC = contaminants of concern

DCE = dichloroethene

EPA = U.S. Environmental Protection

kg/L = kilograms per liter

L/kg = liters per kilogram

u/g = micrograms per liter

MTCA = Washington State Model Toxics Control Act Cleanup Regulation

NA = not analyzed

PCE = tetrachloroethene

TCE = trichloroethene

U = not detected at reporting limit indicated

VC = vinyl chloride

Table 16
Fate and Transport Modeling Results
Remedial Investigation Report
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Aquifer Zone	Source Area Number and Wells	Source Distance from Duwamish (feet)	PCE Source Concentration (Average & Maximum)	Simulated PCE Concentration at Duwamish		TCE Source Concentration (Average & Maximum)	Simulated TCE Concentration at Duwamish		cis-1,2-DCE Source Concentration (Average & Maximum)	Simulated cis-1,2-DCE Concentration at Duwamish		Vinyl Chloride Source Concentration (Average & Maximum)	Simulated Vinyl Chloride Concentration at Duwamish		
				Long-Term	Peak		Long-Term	Peak		Long-Term	Peak		Long-Term	Peak	Peak (Decaying Source)
Water Table Zone	1. CI-12-WT; CI-14-WT	550	0	0	0	1.1	0.04	0.04	14.2	0.39	0.39	2.5	0.66	0.66	--
			0	0	0	1.7	0.05	0.05	48	1.24	1.24	10	2.21	2.21	1.18 (15 yrs)
	2. CI-10-WT	850	0	0	0	49.1	0.35	0.35	22.4	0.79	0.79	0.21	1.12	1.12	--
			0	0	0	87	0.62	0.62	35	1.37	1.37	0.21	1.92	2.67 (15 yrs)	0.95 (25 yrs)
	3. MW-5; MW-6; BDC-6-WT	1500	8.7	0	0	170	0.06	0.06	91.4	0.20	0.20	9.7	0.46	0.46	--
			11	0	0	230	0.09	0.09	130	0.27	0.27	20	0.63	0.63	--
Shallow Zone	1. CI-12-30; CI-14-35	550	0	0	0	67.2	1.40	1.40	26.2	2.54	2.54	19.2	3.13	3.13	1.52 (20 yrs)
			0	0	0	83	1.72	1.72	33	3.15	3.15	28	3.96	3.96	1.92 (20 yrs)
	2. CG-141-40	1050	0	0	0	0	0	0	0	0	0	213.3	0.2	0.2	--
			0	0	0	0	0	0	0	0	0	270	0.25	0.25	--
Intermediate Zone	1. CI-15-60	850	0	0	0	0	0	0	0	0	0	103	0	0	--
			0	0	0	0	0	0	0	0	0	140	0	0	--

NOTES:

Bold denotes simulated concentration above applicable screening level

All concentrations reported in micrograms per liter (ug/L).

Source areas represent Average and Maximum groundwater concentrations over RI Monitoring Period at each well grouping and distance.

Average source concentration is listed in upper row for each COC; maximum source concentration in lower row

Long-term simulated concentrations represent concentrations at 500 years and assume biotransformation is occurring.

Peak concentrations represent maximum simulated concentration if greater than long-term concentration.

Simulations performed using U.S. Environmental Protection Agency BIOCHLOR model.

Continuous source terms were modeled unless a decaying source is indicated

Source decay rate of 0.1 (1/yr) was used for each decaying source simulation

DCE = dichloroethene

COCs = constituents of concern

PCE = tetrachloroethene

RI = Remedial Investigation

TCE = trichloroethene

Table 17
Fate and Transport Modeling - Sensitivity Analysis Results
Remedial Investigation Report
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Aquifer Zone	Source Area Number and Wells	Source Distance from Duwamish (feet)	Sensitivity Analysis Variation	Simulated PCE Concentration at Duwamish	Simulated TCE Concentration at Duwamish	Simulated cis-1,2-DCE Concentration at Duwamish	Simulated Vinyl Chloride Concentration at Duwamish
Water Table Zone	1. CI-12-WT; CI-14-WT	550	Base Case	0	0.04	0.39	0.66
			Source Concentration x2	0	0.07	0.78	1.33
			Source Concentration x0.5	0	0.02	0.20	0.33
			Half Life x5	0	0.22	2.70	1.46
			Half Life x0.2	0	0	0	0.002
			Hydraulic Conductivity x10	0	0.28	3.55	1.29
			Hydraulic Conductivity x0.1	0	0	0	0
			Retardation x2	0	0.04	0.39	0.66
			Retardation x0.5	0	0.04	0.39	0.66
			Dispersivity x2	0	0.03	0.35	0.52
			Dispersivity x0.5	0	0.04	0.46	0.86
	2. CI-10-WT	850	Base Case	0	0.35	0.79	1.12
			Source Concentration x2	0	0.70	1.58	2.23
			Source Concentration x0.5	0	0.18	0.39	0.66
			Half Life x5	0	1.93	2.99	2.56
			Half Life x0.2	0	0	0	0
			Hydraulic Conductivity x10	0	8.79	6.34	1.55
			Hydraulic Conductivity x0.1	0	0	0	0
			Retardation x2	0	0.35	0.79	1.12
			Retardation x0.5	0	0.35	0.79	1.12
			Dispersivity x2	0	0.34	0.7	0.88
			Dispersivity x0.5		0.39	0.95	1.45

Table 17
Fate and Transport Modeling - Sensitivity Analysis Results
Remedial Investigation Report
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Aquifer Zone	Source Area Number and Wells	Source Distance from Duwamish (feet)	Sensitivity Analysis Variation	Simulated PCE Concentration at Duwamish	Simulated TCE Concentration at Duwamish	Simulated cis-1,2-DCE Concentration at Duwamish	Simulated Vinyl Chloride Concentration at Duwamish
Water Table Zone	3. MW-5; MW-6; BDC-6-WT	1500	Base Case	0	0.06	0.20	0.46
			Source Concentration x2	0	0.13	0.40	0.93
			Source Concentration x0.5	0	0.03	0.10	0.23
			Half Life x5	0.22	8.96	11.94	8.57
			Half Life x0.2	0	0	0.00	0
			Hydraulic Conductivity x10	0.61	17.56	16.93	7.56
			Hydraulic Conductivity x0.1	0	0	0.00	0
			Retardation x2	0	0.06	0.20	0.46
			Retardation x0.5	0	0.06	0.20	0.46
			Dispersivity x2	0	0.08	0.23	0.46
Shallow Zone	1. CI-12-30; CI-14-35	550	Dispersivity x0.5	0	0.06	0.21	0.52
			Base Case	0	1.40	2.54	3.13
			Source Concentration x2	0	2.79	5.08	6.26
			Source Concentration x0.5	0	0.70	1.27	1.56
			Half Life x5	0	11.96	9.40	6.42
			Half Life x0.2	0	0.00	0.003	0.009
			Hydraulic Conductivity x10	0	16.21	9.7	6.37
			Hydraulic Conductivity x0.1	0	0	0	0
			Retardation x2	0	1.40	2.54	3.13
			Retardation x0.5	0	1.40	2.54	3.13
			Dispersivity x2	0	1.32	2.12	2.38
			Dispersivity x0.5	0	1.59	3.15	4.12

Table 17
Fate and Transport Modeling - Sensitivity Analysis Results
Remedial Investigation Report
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Aquifer Zone	Source Area Number and Wells	Source Distance from Duwamish (feet)	Sensitivity Analysis Variation	Simulated PCE Concentration at Duwamish	Simulated TCE Concentration at Duwamish	Simulated cis-1,2-DCE Concentration at Duwamish	Simulated Vinyl Chloride Concentration at Duwamish
Shallow Zone	2. CG-141-40	1050	Base Case	0	0	0	0.2
			Source Concentration x2	0	0	0	0.4
			Source Concentration x0.5	0	0	0	0.1
			Half Life x5	0	0	0	14.86
			Half Life x0.2	0	0	0	0
			Hydraulic Conductivity x10	0	0	0	27.42
			Hydraulic Conductivity x0.1	0	0	0	0
			Retardation x2	0	0	0	0.2
			Retardation x0.5	0	0	0	0.2
			Dispersivity x2	0	0	0	0.25
Intermediate Zone	1. CI-15-60	850	Dispersivity x0.5	0	0	0	0.19
			Base Case	0	0	0	0
			Source Concentration x2	0	0	0	0
			Source Concentration x0.5	0	0	0	0
			Half Life x5	0	0	0	0.37
			Half Life x0.2	0	0	0	0
			Hydraulic Conductivity x10	0	0	0	2.78
			Hydraulic Conductivity x0.1	0	0	0	0
			Retardation x2	0	0	0	0
			Retardation x0.5	0	0	0	0
			Dispersivity x2	0	0	0	0
			Dispersivity x0.5	0	0	0	0

NOTES:

Bold denotes simulated concentration exceeds applicable screening level

All concentrations reported in micrograms per liter (ug/L).

Base case simulations represent average groundwater source concentrations over RI monitoring period at each well grouping and distance.

Simulated concentrations at 500 years and assume biotransformation is occurring.

Simulations performed using U.S. Environmental Protection Agency BIOCHLOR model.

DCE = dichloroethene

PCE = tetrachloroethene

RI = Remedial Investigation

TCE = trichloroethene

BIOCHLOR Model Inputs
Water Table Zone
"Source Area" 1 Near Wells CI-12-WT and CI-14-WT
Approx. 550 feet from Duwamish (Slip 2)

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Capital Industries
Water Table Zone

Source Area 1 (550' from Waterway)

Data Input Instructions:

- 115 → 1. Enter value directly....or
↑ or 0.02 → 2. Calculate by filling in gray cells. Press Enter, then **C**
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if
Biotransformation
is Occurring →

Natural Attenuation
Screening Protocol

TYPE OF CHLORINATED SOLVENT:

Ethenes ☒
Ethanes ☐

1. ADVECTION

Seepage Velocity* Vs 79.5 (ft/yr)
or
Hydraulic Conductivity K 1.1E-02 (cm/sec)
Hydraulic Gradient i 0.0017 (ft/ft)
Effective Porosity n 0.25 (-)

2. DISPERSION

Alpha x* 31.2 (ft)
(Alpha y) / (Alpha x)* 0.1 (-)
(Alpha z) / (Alpha x)* 1.E-99 (-)
Calc. Alpha x

3. ADSORPTION

Retardation Factor* R
or
Soil Bulk Density, rho 1.51 (kg/L)
Fraction Organic Carbon, foc 2.0E-3 (-)
Partition Coefficient Koc
PCE 265 (L/kg) 4.20 (-)
TCE 94 (L/kg) 2.14 (-)
DCE 36 (L/kg) 1.43 (-)
VC 19 (L/kg) 1.23 (-)
ETH 302 (L/kg) 4.65 (-)
Common R (used in model)* = 2.14

4. BIOTRANSFORMATION

Zone 1
PCE → TCE 0.578 1.20 0.79
TCE → DCE 0.385 1.80 0.74
DCE → VC 0.433 1.60 0.64
VC → ETH 0.408 1.70 0.45
Zone 2
PCE → TCE 0.000
TCE → DCE 0.000
DCE → VC 0.000
VC → ETH 0.000
λ (1/yr) half-life (yrs) Yield
λ (1/yr) half-life (yrs)

5. GENERAL

Simulation Time* 500 (yr)
Modeled Area Width* 500 (ft)
Modeled Area Length* 550 (ft)
Zone 1 Length* 550 (ft)
Zone 2 Length* 0 (ft)
Zone 2= L - Zone 1

6. SOURCE DATA

Source Options
Source Thickness in Sat. Zone* 20 (ft)
Width* (ft) 50
Conc. (ug/L)* C1
PCE .0
TCE .99
DCE 15.0
VC 10.0
ETH
TYPE: Continuous Single Planar
Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations
View of Plume Looking Down
Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)
TCE Conc. (mg/L)
DCE Conc. (mg/L)
VC Conc. (mg/L)
ETH Conc. (mg/L)
Distance from Source (ft)
Date Data Collected

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE

RUN ARRAY

Help

Restore
Formulas

RESET

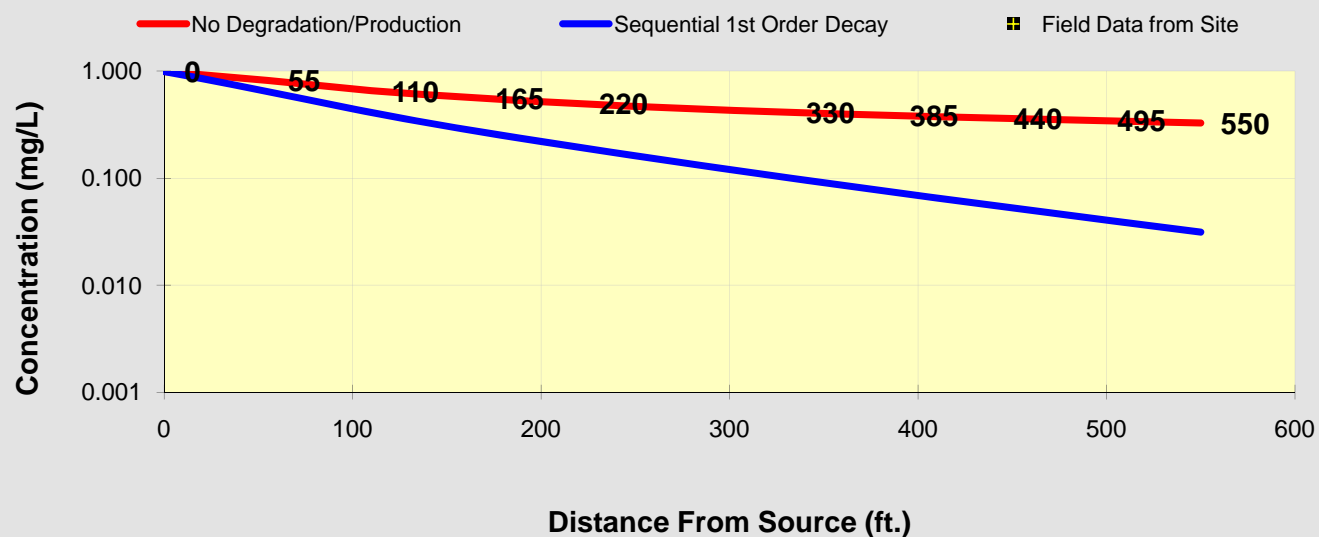
SEE OUTPUT

Paste
Example

Simulated TCE Concentrations - Water Table Zone
 "Source Area" 1: CI-12-WT and CI-14-WT; 550' from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

TCE	Distance from Source (ft)										
	0	55	110	165	220	275	330	385	440	495	550
No Degradation	0.990	0.815	0.653	0.558	0.495	0.449	0.414	0.386	0.363	0.344	0.327
Biotransformation	0.9900	0.644	0.408	0.276	0.193	0.139	0.101	0.075	0.055	0.041	0.031
Field Data from Site	Monitoring Well Locations (ft)										



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

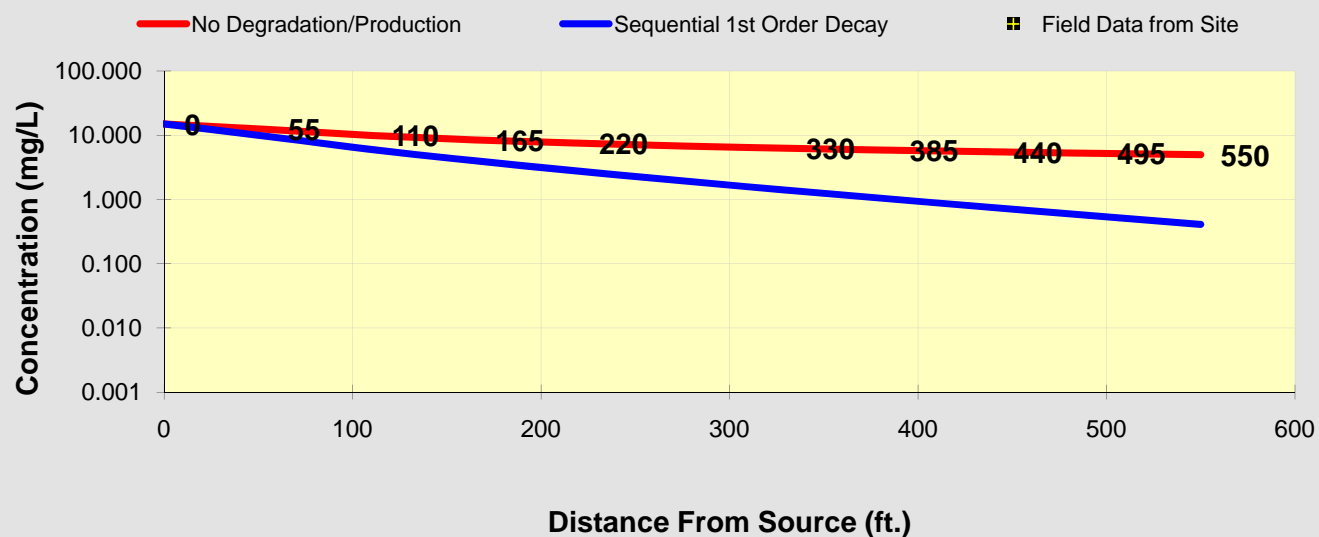
To All

To Array

Simulated cis-1,2-DCE Concentrations - Water Table Zone
 "Source Area" 1: CI-12-WT and CI-14-WT; 550' from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

DCE	Distance from Source (ft)										
	0	55	110	165	220	275	330	385	440	495	550
No Degradation	15.000	12.342	9.900	8.461	7.502	6.807	6.275	5.850	5.501	5.207	4.957
Biotransformation	15.0000	9.604	5.996	3.989	2.754	1.946	1.397	1.014	0.743	0.548	0.407
Field Data from Site	Monitoring Well Locations (ft)										



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

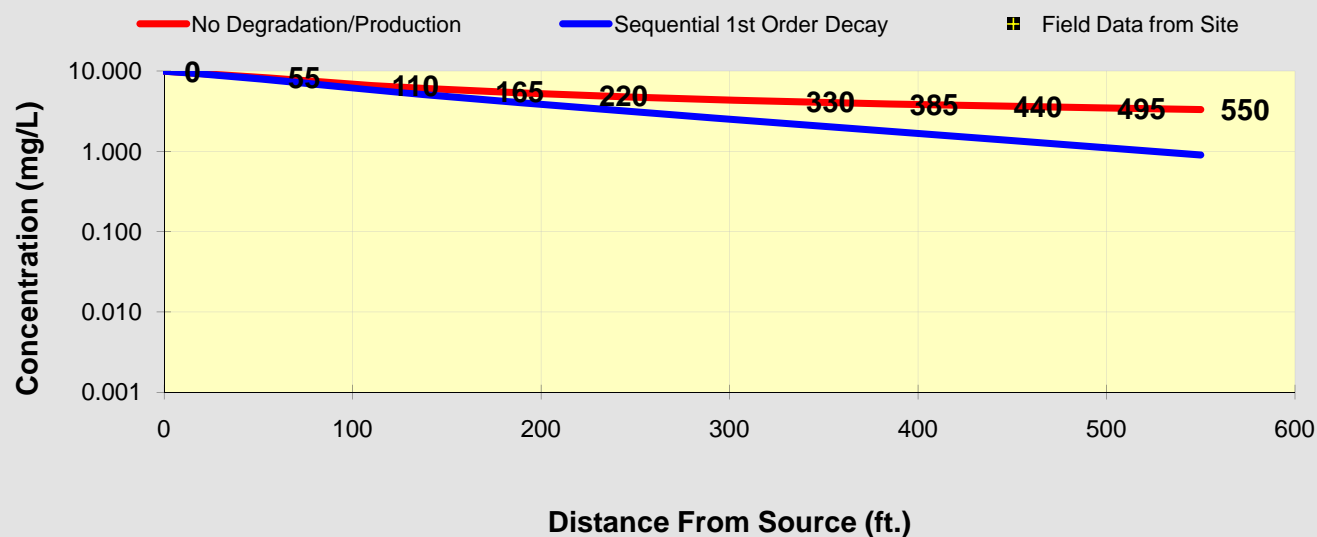
To All

To Array

Simulated Vinyl Chloride Concentrations - Water Table Zone
 "Source Area" 1: CI-12-WT and CI-14-WT; 550' from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

VC	Distance from Source (ft)										
	0	55	110	165	220	275	330	385	440	495	550
No Degradation	10.000	8.228	6.600	5.641	5.002	4.538	4.183	3.900	3.667	3.472	3.304
Biotransformation	10.0000	7.875	5.838	4.498	3.530	2.795	2.223	1.771	1.413	1.127	0.899
Field Data from Site	Monitoring Well Locations (ft)										



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

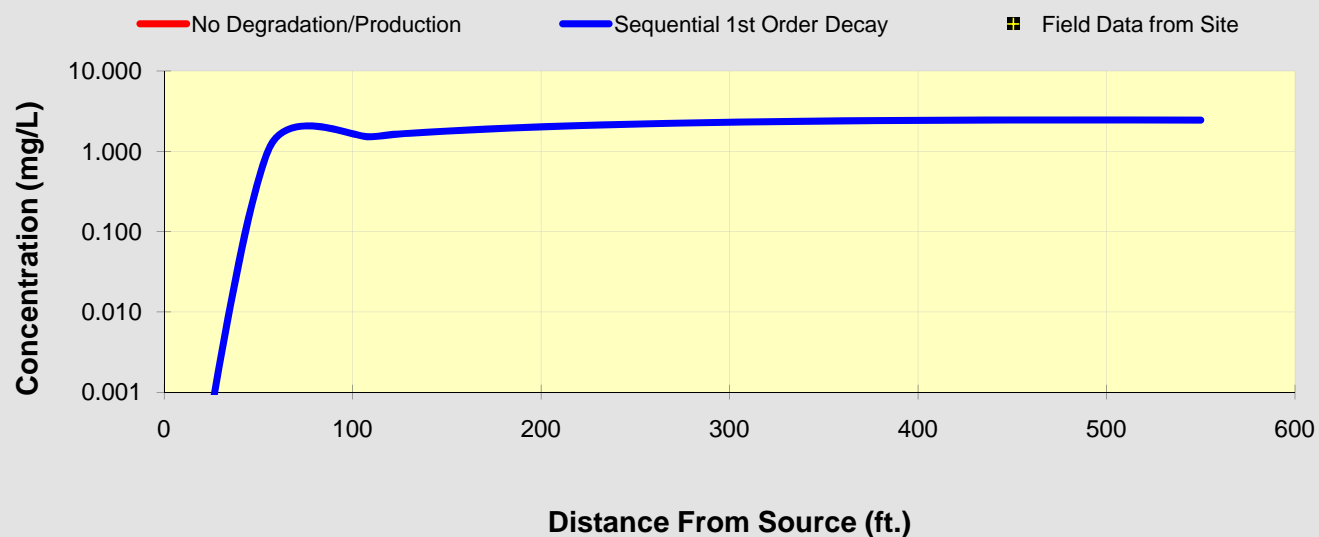
To All

To Array

Simulated Ethene Concentrations - Water Table Zone
 "Source Area" 1: CI-12-WT and CI-14-WT; 550' from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

ETH	Distance from Source (ft)										
	0	55	110	165	220	275	330	385	440	495	550
No Degradation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0000	0.989	1.527	1.871	2.103	2.260	2.363	2.426	2.459	2.470	2.464
Monitoring Well Locations (ft)											
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

To All

To Array

BIOCHLOR Model Inputs
Water Table Zone
"Source Area" 2 Near Well CI-10-WT
Approx. 850 feet from Duwamish (Slip 2)

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Capital Industries
Water Table Zone

Source Area 2 (850' from Waterway)

Data Input Instructions:

- 115 → 1. Enter value directly....or
↑ or 0.02 → 2. Calculate by filling in gray cells. Press Enter, then **C**
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if
Biotransformation
is Occurring →

Natural Attenuation
Screening Protocol

TYPE OF CHLORINATED SOLVENT:

Ethenes ☒
Ethanes ☐

1. ADVECTION

Seepage Velocity* Vs (ft/yr)
or
Hydraulic Conductivity K (cm/sec)
Hydraulic Gradient i (ft/ft)
Effective Porosity n (-)

2. DISPERSION

Alpha x* (ft)
(Alpha y) / (Alpha x)* (-)
(Alpha z) / (Alpha x)* (-)
Calc. Alpha x

3. ADSORPTION

Retardation Factor*
or
Soil Bulk Density, rho (kg/L)
Fraction Organic Carbon, foc (-)
Partition Coefficient Koc (L/kg)
PCE (L/kg) (-)
TCE (L/kg) (-)
DCE (L/kg) (-)
VC (L/kg) (-)
ETH (-)
Common R (used in model)* =

4. BIOTRANSFORMATION

Zone 1
PCE → TCE 0.79
TCE → DCE 0.74
DCE → VC 0.64
VC → ETH 0.45
Zone 2
PCE → TCE
TCE → DCE
DCE → VC
VC → ETH
λ (1/yr) half-life (yrs) Yield
λ (1/yr) half-life (yrs)

5. GENERAL

Simulation Time* (yr)
Modeled Area Width* (ft)
Modeled Area Length* (ft)
Zone 1 Length* (ft)
Zone 2 Length* (ft)
Zone 2= L - Zone 1

6. SOURCE DATA

Source Options
Source Thickness in Sat. Zone* (ft)
Width* (ft)
Conc. (ug/L)* C1
PCE
TCE
DCE
VC
ETH
TYPE: Continuous
Single Planar
k_s* (1/yr)
0
0
0
0
0
0

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)
TCE Conc. (mg/L)
DCE Conc. (mg/L)
VC Conc. (mg/L)
ETH Conc. (mg/L)
Distance from Source (ft)
Date Data Collected

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE

RUN ARRAY

Help

Restore
Formulas

RESET

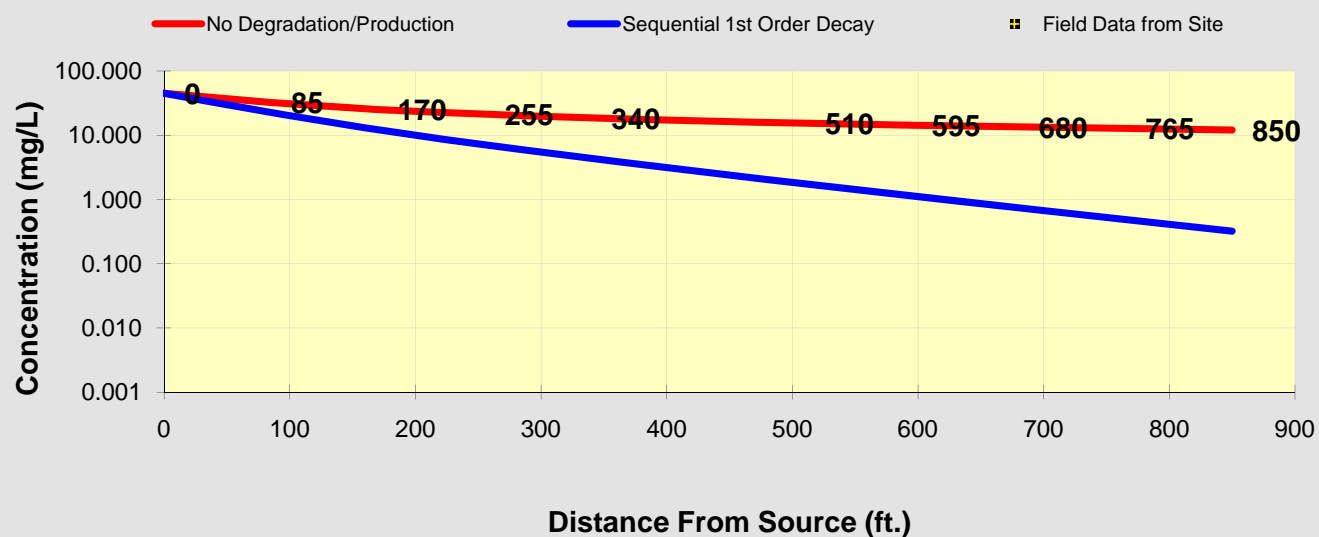
SEE OUTPUT

Paste
Example

Simulated TCE Concentrations - Water Table Zone
 "Source Area" 2: CI-10-WT; 850 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

TCE	Distance from Source (ft)										
	0	85	170	255	340	425	510	595	680	765	850
No Degradation	45.000	32.504	25.077	21.112	18.572	16.769	15.406	14.328	13.449	12.714	12.087
Biotransformation	45.0000	22.605	12.128	7.101	4.344	2.728	1.743	1.127	0.736	0.484	0.320
Field Data from Site	Monitoring Well Locations (ft)										



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

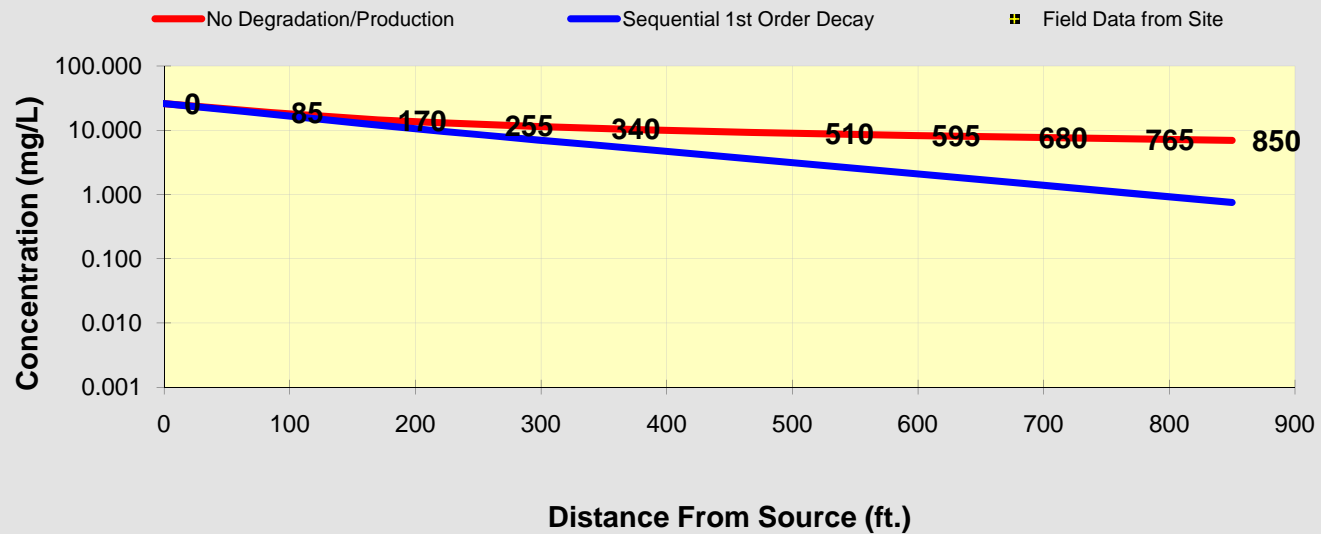
To All

To Array

Simulated cis-1,2-DCE Concentrations - Water Table Zone
 "Source Area" 2: CI-10-WT; 850 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

DCE	Distance from Source (ft)										
	0	85	170	255	340	425	510	595	680	765	850
No Degradation	26.000	18.780	14.489	12.198	10.730	9.689	8.901	8.279	7.771	7.346	6.984
Biotransformation	26.0000	17.795	11.988	8.392	5.940	4.217	2.993	2.121	1.501	1.060	0.748
Monitoring Well Locations (ft)											
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

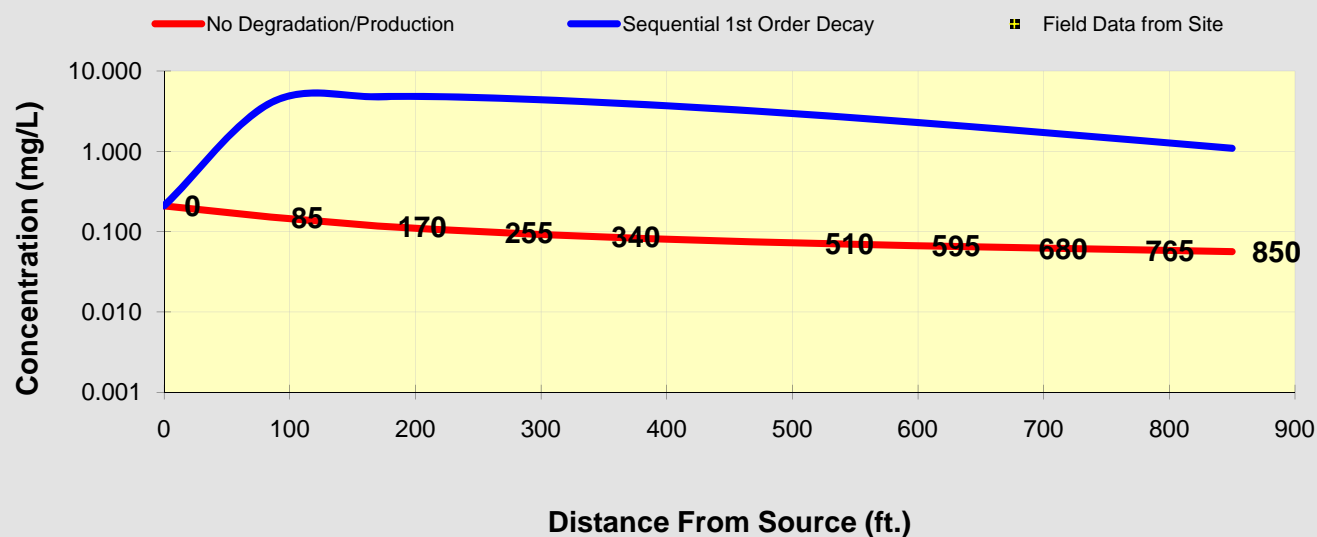
To All

To Array

Simulated Vinyl Chloride Concentrations - Water Table Zone
 "Source Area" 2: CI-10-WT; 850 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

VC	Distance from Source (ft)										
	0	85	170	255	340	425	510	595	680	765	850
No Degradation	0.210	0.152	0.117	0.099	0.087	0.078	0.072	0.067	0.063	0.059	0.056
Biotransformation	0.2100	4.006	4.775	4.625	4.117	3.492	2.870	2.305	1.819	1.416	1.090
	Monitoring Well Locations (ft)										
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

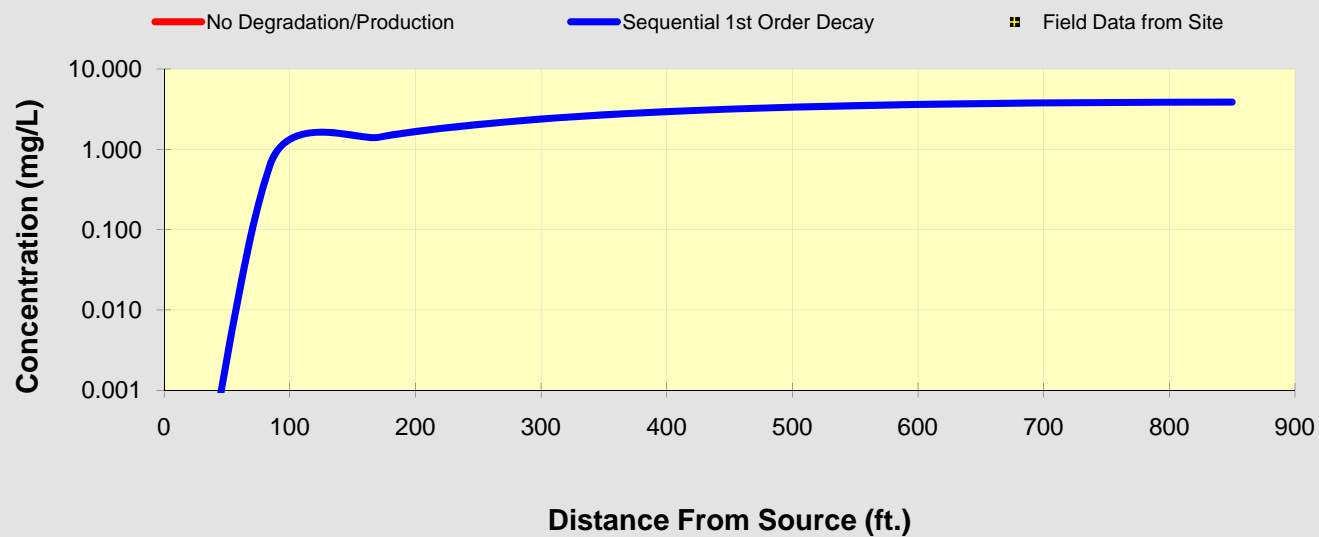
To All

To Array

Simulated Ethene Concentrations - Water Table Zone
 "Source Area" 2: CI-10-WT; 850 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

ETH	Distance from Source (ft)										
	0	85	170	255	340	425	510	595	680	765	850
No Degradation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0000	0.670	1.400	2.065	2.620	3.055	3.377	3.602	3.747	3.828	3.860
Monitoring Well Locations (ft)											
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

To All

To Array

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Capital Industries
Water Table Zone

Source Area 3 (1500' from Waterway)

Data Input Instructions:

- 115 → 1. Enter value directly....or
↑ or 0.02 → 2. Calculate by filling in gray cells. Press Enter, then **C**
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if
Biotransformation
is Occurring →

Natural Attenuation
Screening Protocol

TYPE OF CHLORINATED SOLVENT:

Ethenes ☒
Ethanes ☐

1. ADVECTION

Seepage Velocity* Vs 79.5 (ft/yr)
or
Hydraulic Conductivity K 1.1E-02 (cm/sec)
Hydraulic Gradient i 0.0017 (ft/ft)
Effective Porosity n 0.25 (-)

2. DISPERSION

Alpha x* 31.2 (ft)
(Alpha y) / (Alpha x)* 0.1 (-)
(Alpha z) / (Alpha x)* 1.E-99 (-)
Calc. Alpha x

3. ADSORPTION

Retardation Factor* R
or
Soil Bulk Density, rho 1.51 (kg/L)
Fraction Organic Carbon, foc 2.0E-3 (-)
Partition Coefficient Koc
PCE 265 (L/kg) 4.20 (-)
TCE 94 (L/kg) 2.14 (-)
DCE 36 (L/kg) 1.43 (-)
VC 19 (L/kg) 1.23 (-)
ETH 302 (L/kg) 4.65 (-)
Common R (used in model)* = 2.14

4. BIOTRANSFORMATION

Zone 1
PCE → TCE 0.578 1.20 0.79
TCE → DCE 0.385 1.80 0.74
DCE → VC 0.433 1.60 0.64
VC → ETH 0.408 1.70 0.45
Zone 2
PCE → TCE 0.000
TCE → DCE 0.000
DCE → VC 0.000
VC → ETH 0.000
λ (1/yr) half-life (yrs) Yield
λ (1/yr) half-life (yrs)

5. GENERAL

Simulation Time* 500 (yr)
Modeled Area Width* 500 (ft)
Modeled Area Length* 1500 (ft)
Zone 1 Length* 1500 (ft)
Zone 2 Length* 0 (ft)
Zone 2= L - Zone 1

6. SOURCE DATA

Source Options
Source Thickness in Sat. Zone* 20 (ft)
Width* (ft) 50
Conc. (ug/L)* C1
PCE 6.2
TCE 170.0
DCE 120.0
VC 4.6
ETH
TYPE: Continuous Single Planar
k_s* (1/yr)
0
0
0
0
0
0

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)
TCE Conc. (mg/L)
DCE Conc. (mg/L)
VC Conc. (mg/L)
ETH Conc. (mg/L)
Distance from Source (ft)
Date Data Collected

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE

RUN ARRAY

Help

Restore
Formulas

RESET

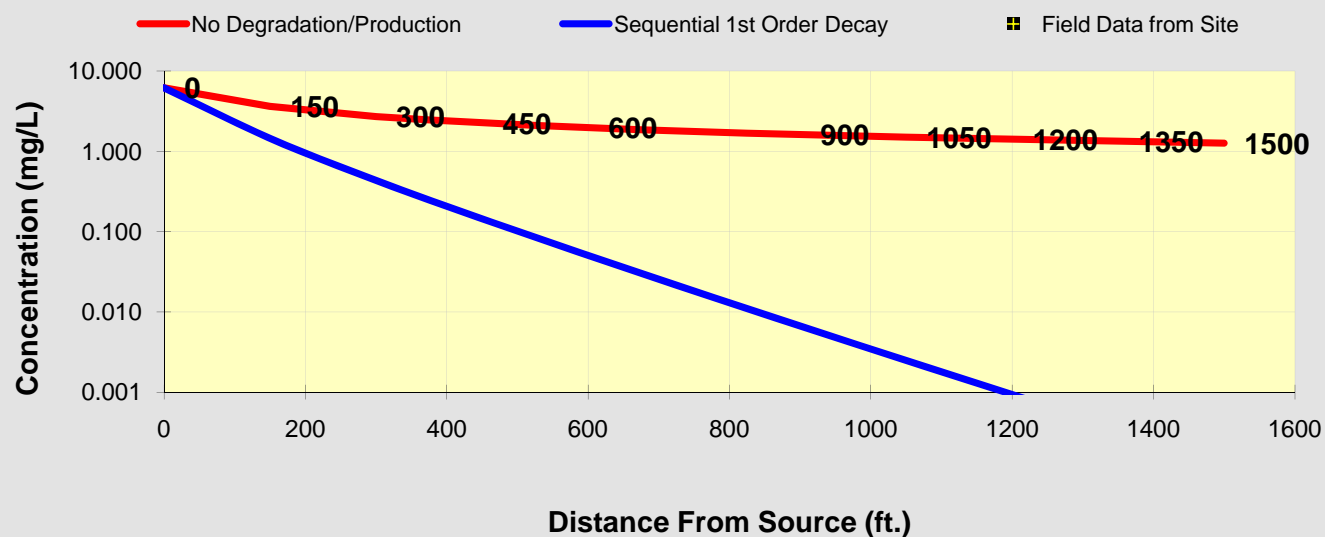
SEE OUTPUT

Paste
Example

Simulated PCE Concentrations
 "Source Area" 3: MW-5, MW-6, BDC-6-WT; 1500 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

PCE	Distance from Source (ft)											
	0	150	300	450	600	750	900	1050	1200	1350	1500	
No Degradation	6.200	3.634	2.707	2.250	1.966	1.768	1.620	1.504	1.410	1.331	1.264	
Biotransformation	6.2000	1.455	0.434	0.144	0.051	0.018	0.007	0.002	0.001	0.000	0.000	
Monitoring Well Locations (ft)												
Field Data from Site												



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

To All

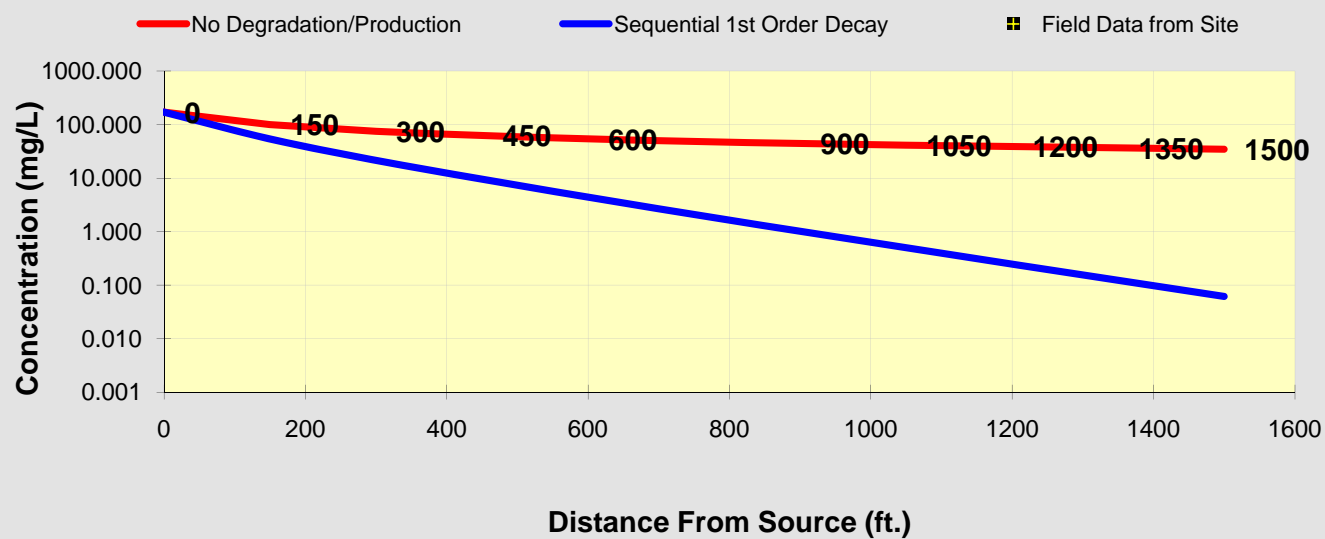
To Array

Simulated TCE Concentrations
 "Source Area" 3: MW-5, MW-6, BDC-6-WT; 1500 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

TCE	Distance from Source (ft)										
	0	150	300	450	600	750	900	1050	1200	1350	1500
No Degradation	170.000	99.647	74.224	61.696	53.915	48.487	44.424	41.236	38.649	36.494	34.664
Biotransformation	170.0000	53.589	21.355	9.459	4.393	2.095	1.016	0.499	0.247	0.123	0.062

Monitoring Well Locations (ft)										
Field Data from Site										



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

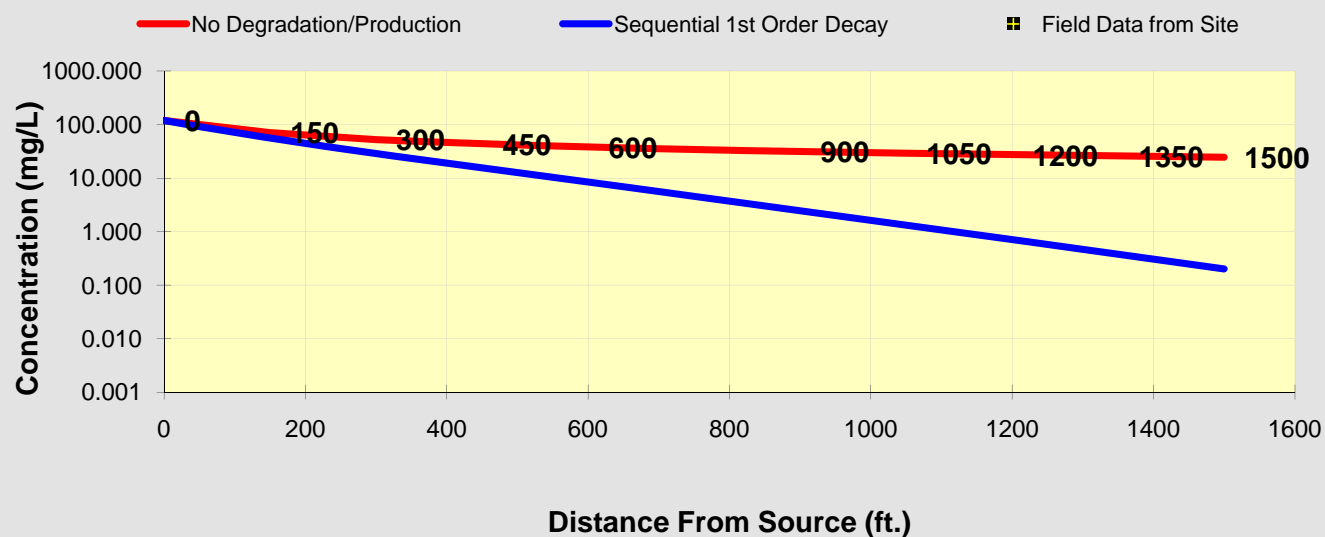
To All

To Array

Simulated cis-1,2-DCE Concentrations
 "Source Area" 3: MW-5, MW-6, BDC-6-WT; 1500 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

DCE	Distance from Source (ft)										
	0	150	300	450	600	750	900	1050	1200	1350	1500
No Degradation	120.000	70.339	52.393	43.550	38.058	34.226	31.358	29.108	27.282	25.761	24.469
Biotransformation	120.0000	56.007	29.050	15.654	8.481	4.587	2.472	1.327	0.710	0.379	0.201
Monitoring Well Locations (ft)											
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

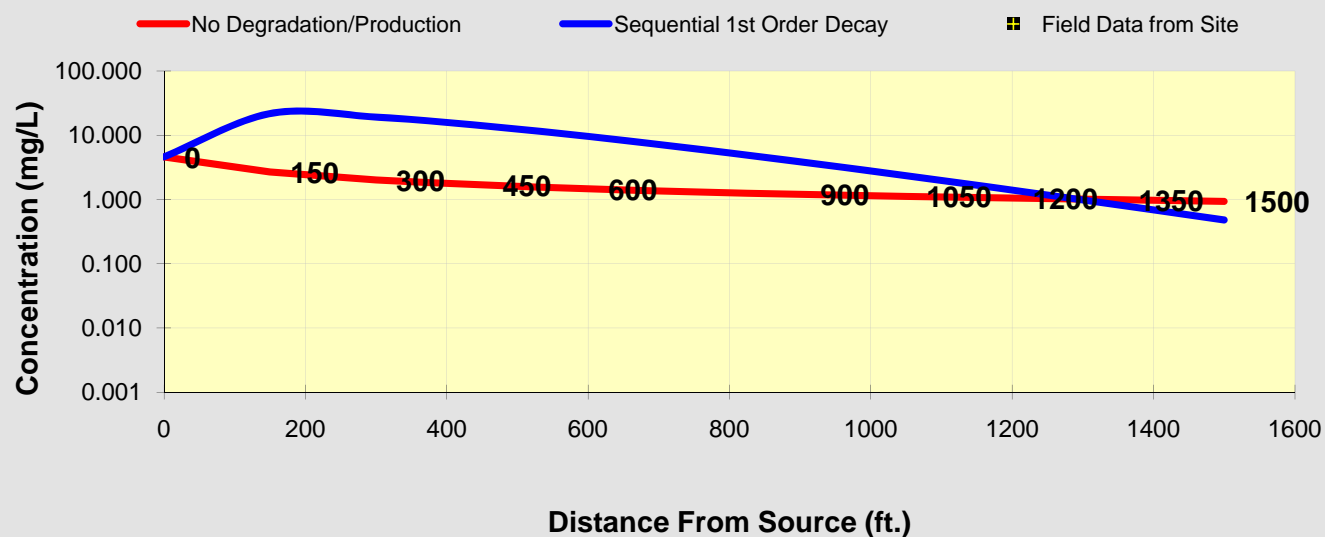
To All

To Array

Simulated Vinyl Chloride Concentrations
 "Source Area" 3: MW-5, MW-6, BDC-6-WT; 1500 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

VC	Distance from Source (ft)										
	0	150	300	450	600	750	900	1050	1200	1350	1500
No Degradation	4.600	2.696	2.008	1.669	1.459	1.312	1.202	1.116	1.046	0.987	0.938
Biotransformation	4.6000	21.613	19.071	14.051	9.536	6.159	3.846	2.343	1.400	0.824	0.479
Field Data from Site	Monitoring Well Locations (ft)										



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

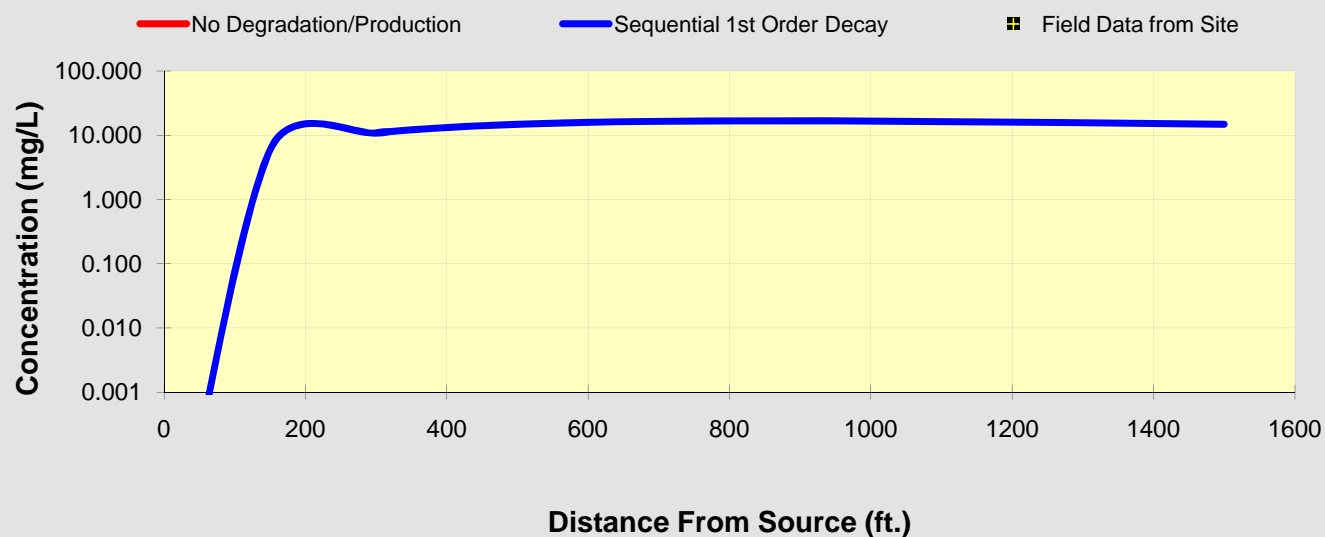
To All

To Array

Simulated Ethene Concentrations
 "Source Area" 3: MW-5, MW-6, BDC-6-WT; 1500 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

ETH	Distance from Source (ft)										
	0	150	300	450	600	750	900	1050	1200	1350	1500
No Degradation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0000	5.871	10.790	14.051	15.862	16.634	16.745	16.472	15.998	15.438	14.858
Monitoring Well Locations (ft)											
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

To All

To Array

BIOCHLOR Model Inputs
Shallow Zone
"Source Area" 1 Near Wells CI-12-30 and CI-14-35
Approx. 550 feet from Duwamish (Slip 2)

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Capital Industries
Shallow Zone

Source Area 1 (550' from Waterway)

Data Input Instructions:

- 115 → 1. Enter value directly....or
↑ or 0.02 → 2. Calculate by filling in gray cells. Press Enter, then **C**
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if
Biotransformation
is Occurring →

Natural Attenuation
Screening Protocol

TYPE OF CHLORINATED SOLVENT:

Ethenes ☒
Ethanes ☐

1. ADVECTION

Seepage Velocity* Vs 66.2 (ft/yr)
or
Hydraulic Conductivity K 9.99E-03 (cm/sec)
Hydraulic Gradient i 0.0016 (ft/ft)
Effective Porosity n 0.25 (-)

2. DISPERSION

Alpha x* 31.2 (ft)
(Alpha y) / (Alpha x)* 0.1 (-)
(Alpha z) / (Alpha x)* 1.E-99 (-)
Calc. Alpha x

3. ADSORPTION

Retardation Factor* R
or
Soil Bulk Density, rho 1.51 (kg/L)
Fraction Organic Carbon, foc 2.2E-3 (-)
Partition Coefficient Koc
PCE 265 (L/kg) 4.52 (-)
TCE 94 (L/kg) 2.25 (-)
DCE 36 (L/kg) 1.47 (-)
VC 19 (L/kg) 1.25 (-)
ETH 302 (L/kg) 5.01 (-)
Common R (used in model)* = 2.25

4. BIOTRANSFORMATION

Zone 1
PCE → TCE 0.578 1.20 0.79
TCE → DCE 0.385 1.80 0.74
DCE → VC 0.433 1.60 0.64
VC → ETH 0.408 1.70 0.45
Zone 2
PCE → TCE 0.000
TCE → DCE 0.000
DCE → VC 0.000
VC → ETH 0.000
λ (1/yr) half-life (yrs) Yield
λ (1/yr) half-life (yrs)

5. GENERAL

Simulation Time* 500 (yr)
Modeled Area Width* 500 (ft)
Modeled Area Length* 550 (ft)
Zone 1 Length* 550 (ft)
Zone 2 Length* 0 (ft)
Zone 2= L - Zone 1

6. SOURCE DATA

Source Options
Source Thickness in Sat. Zone* 20 (ft)
Width* (ft) 50
Conc. (ug/L)* C1
PCE .0
TCE 68.0
DCE 24.0
VC 10.0
ETH
TYPE: Continuous Single Planar
k_s* (1/yr)
0
0
0
0
0
0

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)
TCE Conc. (mg/L)
DCE Conc. (mg/L)
VC Conc. (mg/L)
ETH Conc. (mg/L)
Distance from Source (ft)
Date Data Collected

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE

RUN ARRAY

Help

Restore
Formulas

RESET

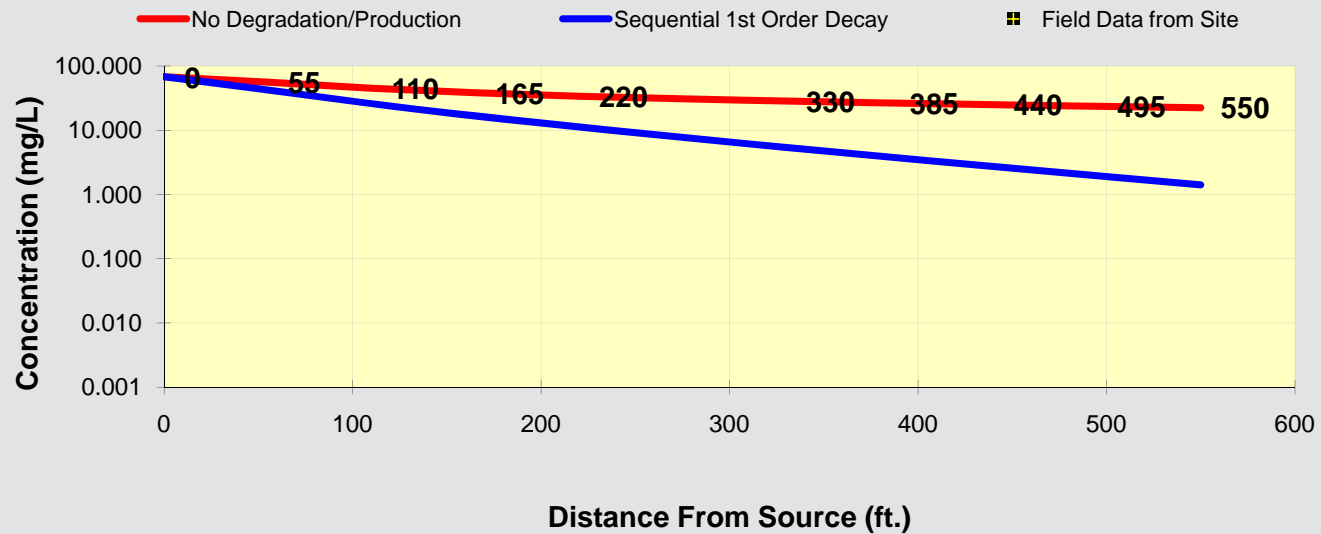
SEE OUTPUT

Paste
Example

Simulated TCE Concentrations - Shallow Zone
 "Source Area" 1: CI-14-35 and CI-12-30; 550 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

TCE	Distance from Source (ft)										
	0	55	110	165	220	275	330	385	440	495	550
No Degradation	68.000	55.952	44.882	38.358	34.011	30.860	28.445	26.519	24.937	23.607	22.469
Biotransformation	68.0000	42.428	25.808	16.726	11.246	7.738	5.408	3.823	2.726	1.957	1.413
Monitoring Well Locations (ft)											
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

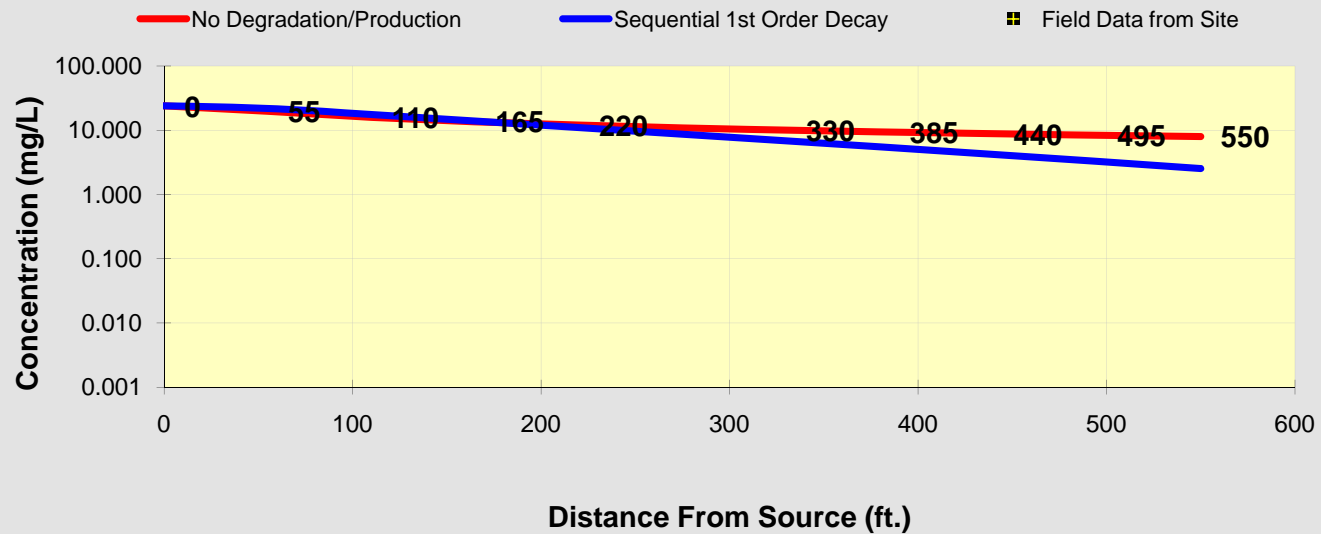
To All

To Array

Simulated cis-1,2-DCE Concentrations - Shallow Zone
 "Source Area" 1: CI-14-35 and CI-12-30; 550 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

DCE	Distance from Source (ft)										
	0	55	110	165	220	275	330	385	440	495	550
No Degradation	24.000	19.748	15.841	13.538	12.004	10.892	10.040	9.360	8.801	8.332	7.930
Biotransformation	24.0000	21.944	17.462	13.904	11.036	8.721	6.860	5.374	4.195	3.264	2.533
Monitoring Well Locations (ft)											
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log ↔ Linear

Return to
Input

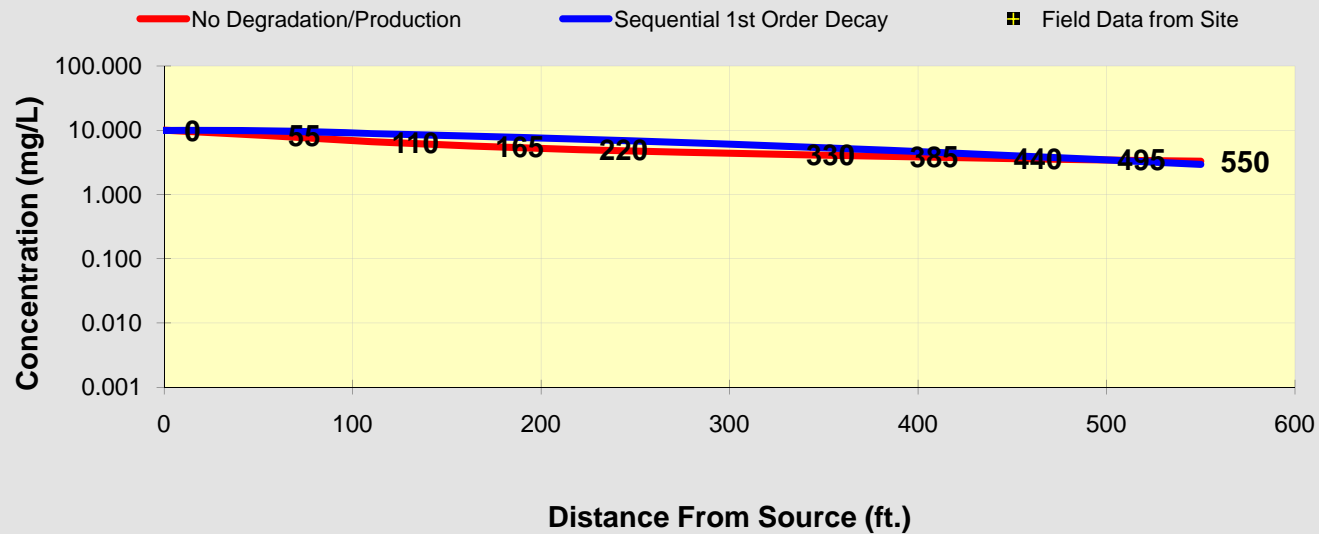
To All

To Array

Simulated Vinyl Chloride Concentrations - Shallow Zone
 "Source Area" 1: CI-14-35 and CI-12-30; 550 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

VC	Distance from Source (ft)										
	0	55	110	165	220	275	330	385	440	495	550
No Degradation	10.000	8.228	6.600	5.641	5.002	4.538	4.183	3.900	3.667	3.472	3.304
Biotransformation	10.0000	9.891	8.926	8.095	7.270	6.438	5.624	4.850	4.137	3.494	2.926
Monitoring Well Locations (ft)											
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

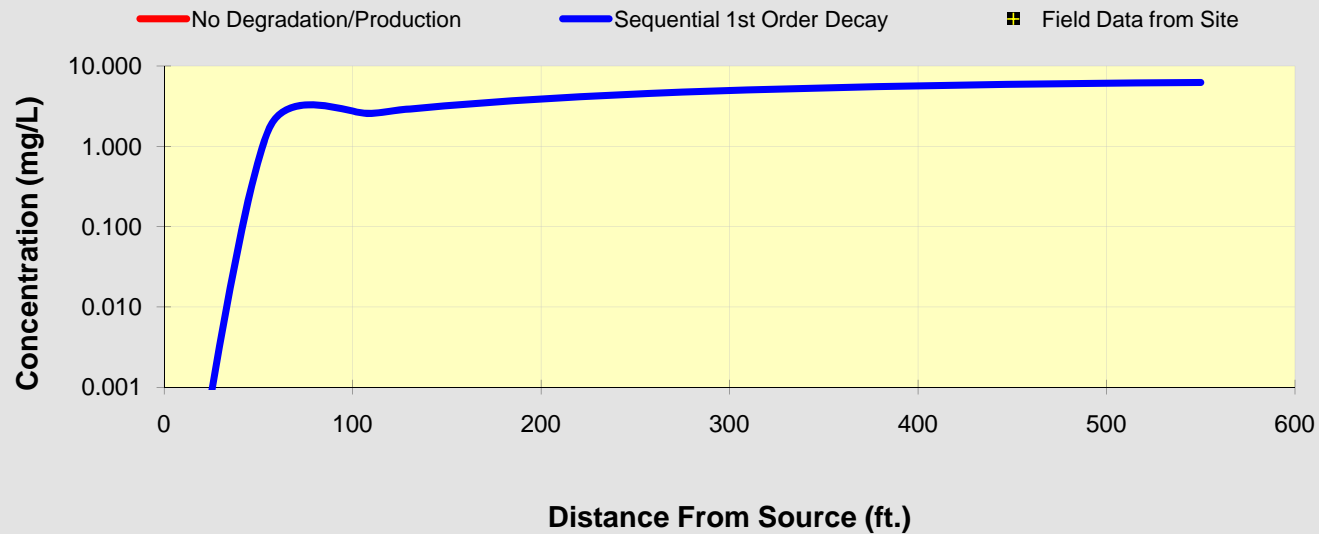
To All

To Array

Simulated Ethene Concentrations - Shallow Zone
 "Source Area" 1: CI-14-35 and CI-12-30; 550 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

ETH	Distance from Source (ft)										
	0	55	110	165	220	275	330	385	440	495	550
No Degradation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0000	1.507	2.563	3.417	4.129	4.720	5.201	5.582	5.874	6.090	6.239
Monitoring Well Locations (ft)											
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

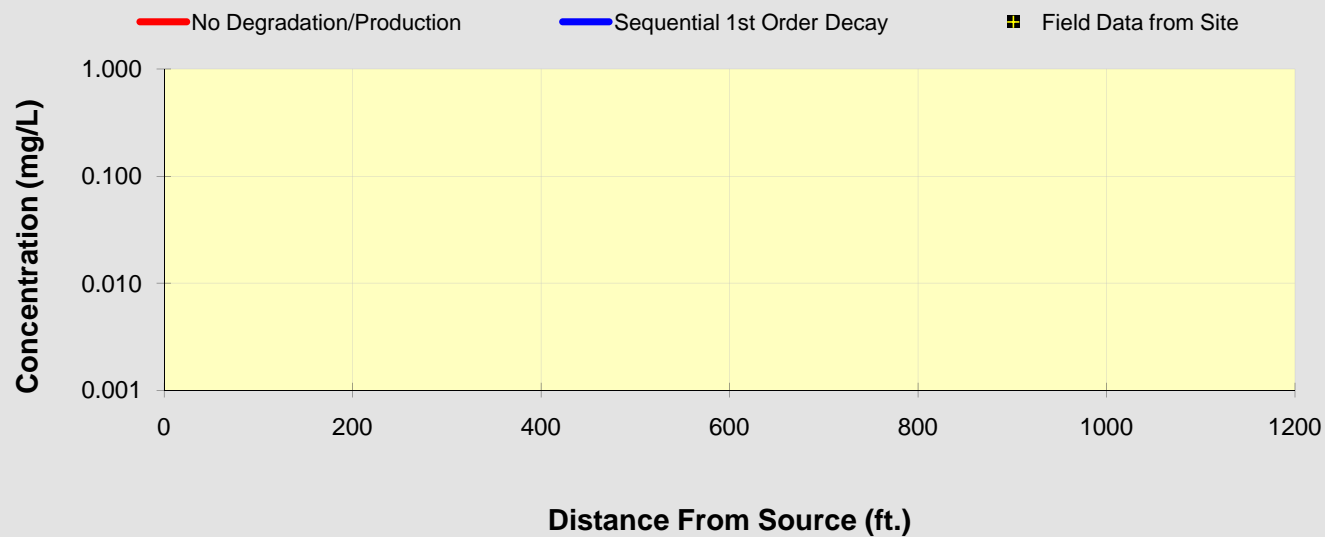
To All

To Array

Simulated cis-1,2-DCE Concentrations - Shallow Zone
 "Source Area" 2: CG-141-40; 1050 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

DCE	Distance from Source (ft)										
	0	105	210	315	420	525	630	735	840	945	1050
No Degradation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Monitoring Well Locations (ft)											
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

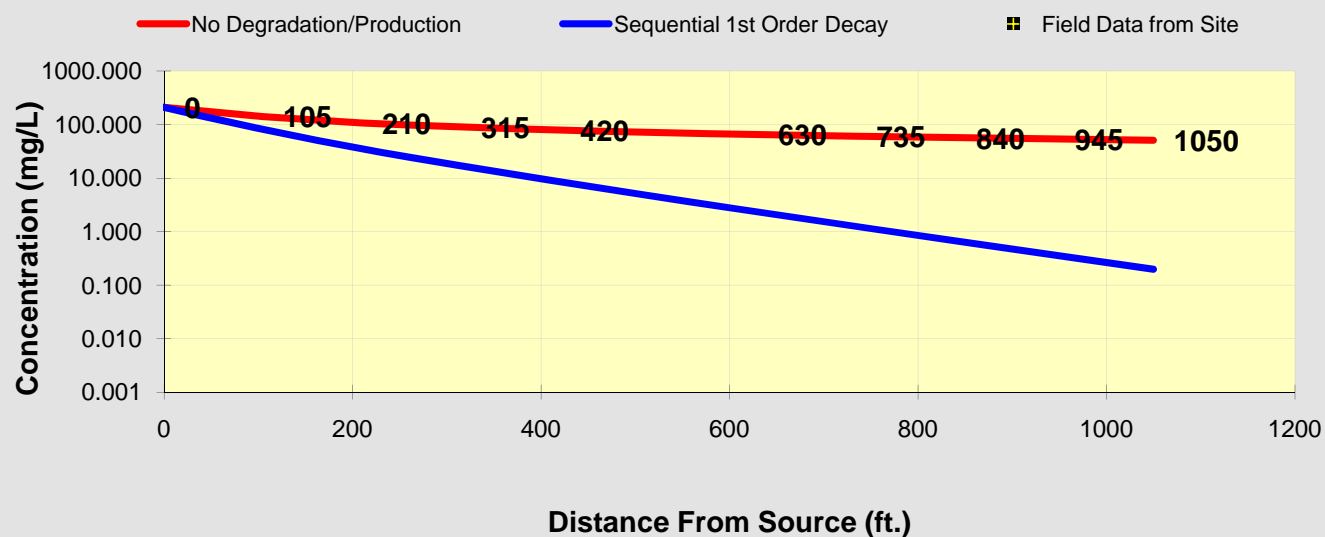
To All

To Array

Simulated Vinyl Chloride Concentrations - Shallow Zone
 "Source Area" 2: CG-141-40; 1050 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

VC	Distance from Source (ft)										
	0	105	210	315	420	525	630	735	840	945	1050
No Degradation	210.000	140.967	107.141	89.706	78.685	70.924	65.080	60.477	56.729	53.601	50.939
Biotransformation	210.0000	80.894	35.282	16.952	8.533	4.413	2.324	1.239	0.667	0.362	0.197
Monitoring Well Locations (ft)											
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

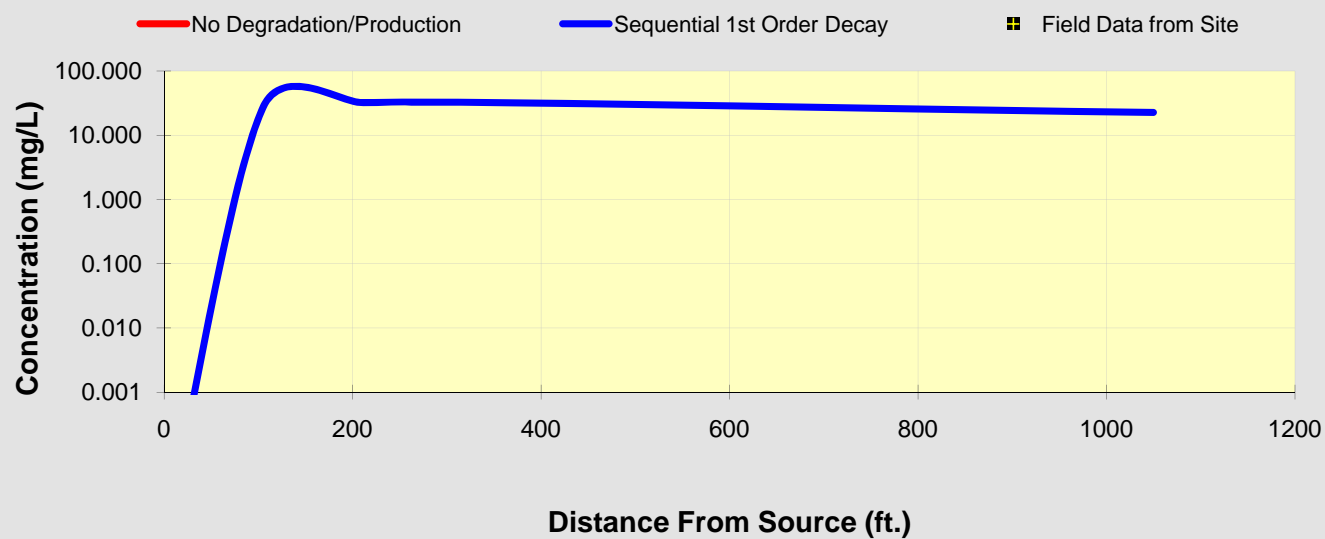
To All

To Array

Simulated Ethene Concentrations - Shallow Zone
 "Source Area" 2: CG-141-40; 1050 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

ETH	Distance from Source (ft)										
	0	105	210	315	420	525	630	735	840	945	1050
No Degradation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0000	27.009	32.308	32.710	31.541	29.903	28.215	26.633	25.205	23.936	22.814
Monitoring Well Locations (ft)											
Field Data from Site											



Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

To All

To Array

BIOCHLOR Model Inputs
Intermediate Zone
"Source Area" Near Well CI-15-60
Approx. 850 feet from Duwamish (Slip 2)

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Capital Industries
Intermediate Zone

Source Area 1 (850' from Waterway)

Data Input Instructions:

- 115 → 1. Enter value directly....or
↑ or 0.02 → 2. Calculate by filling in gray cells. Press Enter, then **C**
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if
Biotransformation
is Occurring →

Natural Attenuation
Screening Protocol

TYPE OF CHLORINATED SOLVENT:

Ethenes ☒
Ethanes ☐

1. ADVECTION

Seepage Velocity* Vs 13.9 (ft/yr)
or
Hydraulic Conductivity K 2.10E-03 (cm/sec)
Hydraulic Gradient i 0.0016 (ft/ft)
Effective Porosity n 0.25 (-)

2. DISPERSION

Alpha x* 31.2 (ft)
(Alpha y) / (Alpha x)* 0.1 (-)
(Alpha z) / (Alpha x)* 1.E-99 (-)
Calc. Alpha x

3. ADSORPTION

Retardation Factor* R
or
Soil Bulk Density, rho 1.51 (kg/L)
Fraction Organic Carbon, foc 2.5E-3 (-)
Partition Coefficient Koc
PCE 265 (L/kg) 5.00 (-)
TCE 94 (L/kg) 2.42 (-)
DCE 36 (L/kg) 1.54 (-)
VC 19 (L/kg) 1.29 (-)
ETH 302 (L/kg) 5.56 (-)
Common R (used in model)* = 2.42

4. BIOTRANSFORMATION

Zone 1
PCE → TCE 0.578 (1/yr) 1.20 (yrs) 0.79
TCE → DCE 0.385 (1/yr) 1.80 (yrs) 0.74
DCE → VC 0.433 (1/yr) 1.60 (yrs) 0.64
VC → ETH 0.408 (1/yr) 1.70 (yrs) 0.45
Zone 2
PCE → TCE 0.000 (1/yr) 0.000 (yrs)
TCE → DCE 0.000 (1/yr) 0.000 (yrs)
DCE → VC 0.000 (1/yr) 0.000 (yrs)
VC → ETH 0.000 (1/yr) 0.000 (yrs)
λ (1/yr) half-life (yrs) Yield
λ (1/yr) half-life (yrs)

5. GENERAL

Simulation Time* 500 (yr)
Modeled Area Width* 500 (ft)
Modeled Area Length* 850 (ft)
Zone 1 Length* 850 (ft)
Zone 2 Length* 0 (ft)
Zone 2= L - Zone 1

6. SOURCE DATA

Source Options
Source Thickness in Sat. Zone* 20 (ft)
Width* (ft) 50
Conc. (ug/L)* C1
PCE .0
TCE .0
DCE .0
VC 83.0
ETH .0
TYPE: Continuous Single Planar
Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations
View of Plume Looking Down
Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)
TCE Conc. (mg/L)
DCE Conc. (mg/L)
VC Conc. (mg/L)
ETH Conc. (mg/L)
Distance from Source (ft)
Date Data Collected

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE

RUN ARRAY

Help

Restore
Formulas

RESET

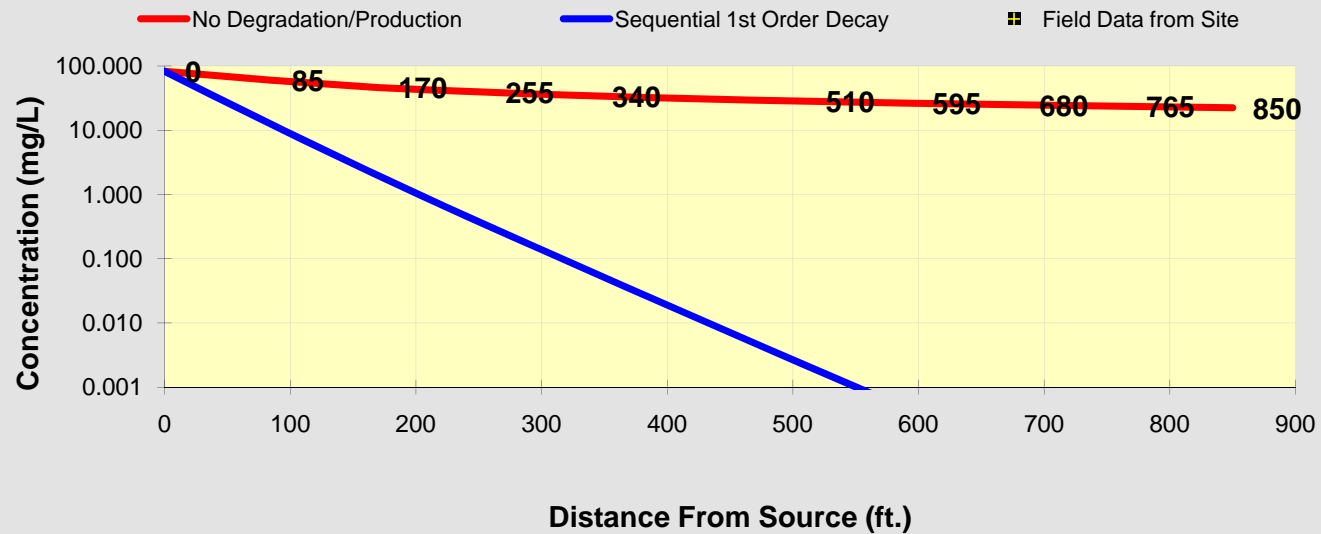
SEE OUTPUT

Paste
Example

Simulated Vinyl Chloride Concentrations - Intermediate Zone
 "Source Area": CI-15-60; 850 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

VC	Distance from Source (ft)										
	0	85	170	255	340	425	510	595	680	765	850
No Degradation	83.000	59.952	46.253	38.940	34.255	30.930	28.415	26.428	24.806	23.450	22.294
Biotransformation	83.0000	12.374	1.971	0.342	0.062	0.012	0.002	0.000	0.000	0.000	0.000
Monitoring Well Locations (ft)											
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

Log \longleftrightarrow Linear

Return to
Input

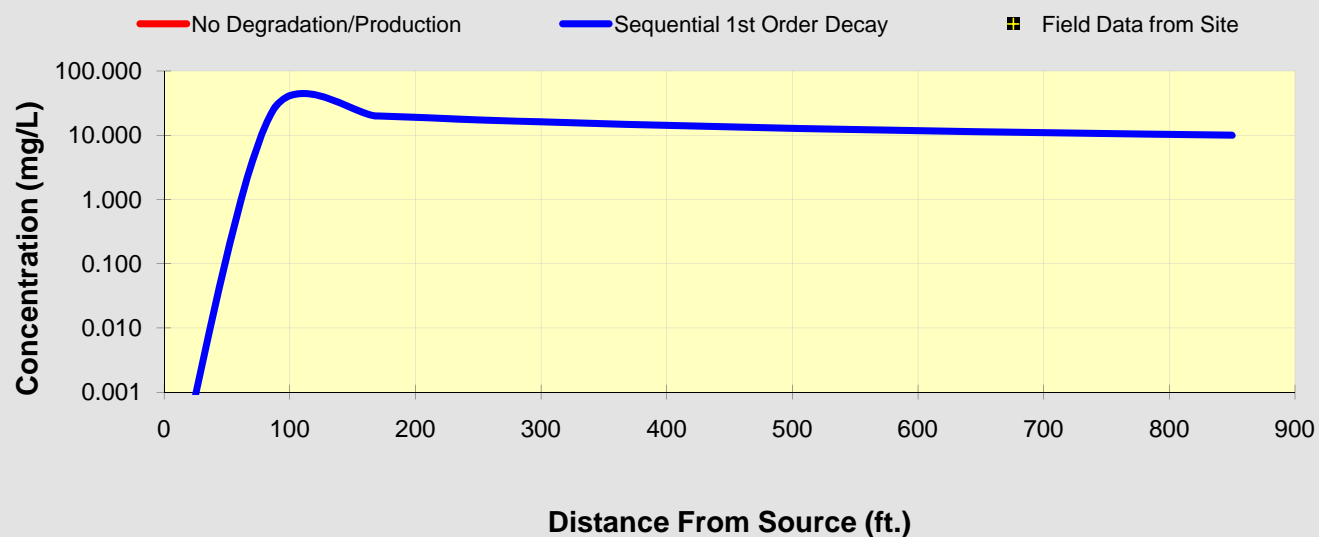
To All

To Array

Simulated Ethene Concentrations - Intermediate Zone
 "Source Area": CI-15-60; 850 feet from Slip 2

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

ETH	Distance from Source (ft)										
	0	85	170	255	340	425	510	595	680	765	850
No Degradation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0000	21.391	19.909	17.354	15.373	13.901	12.774	11.882	11.153	10.543	10.024
Monitoring Well Locations (ft)											
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

500.0 Years

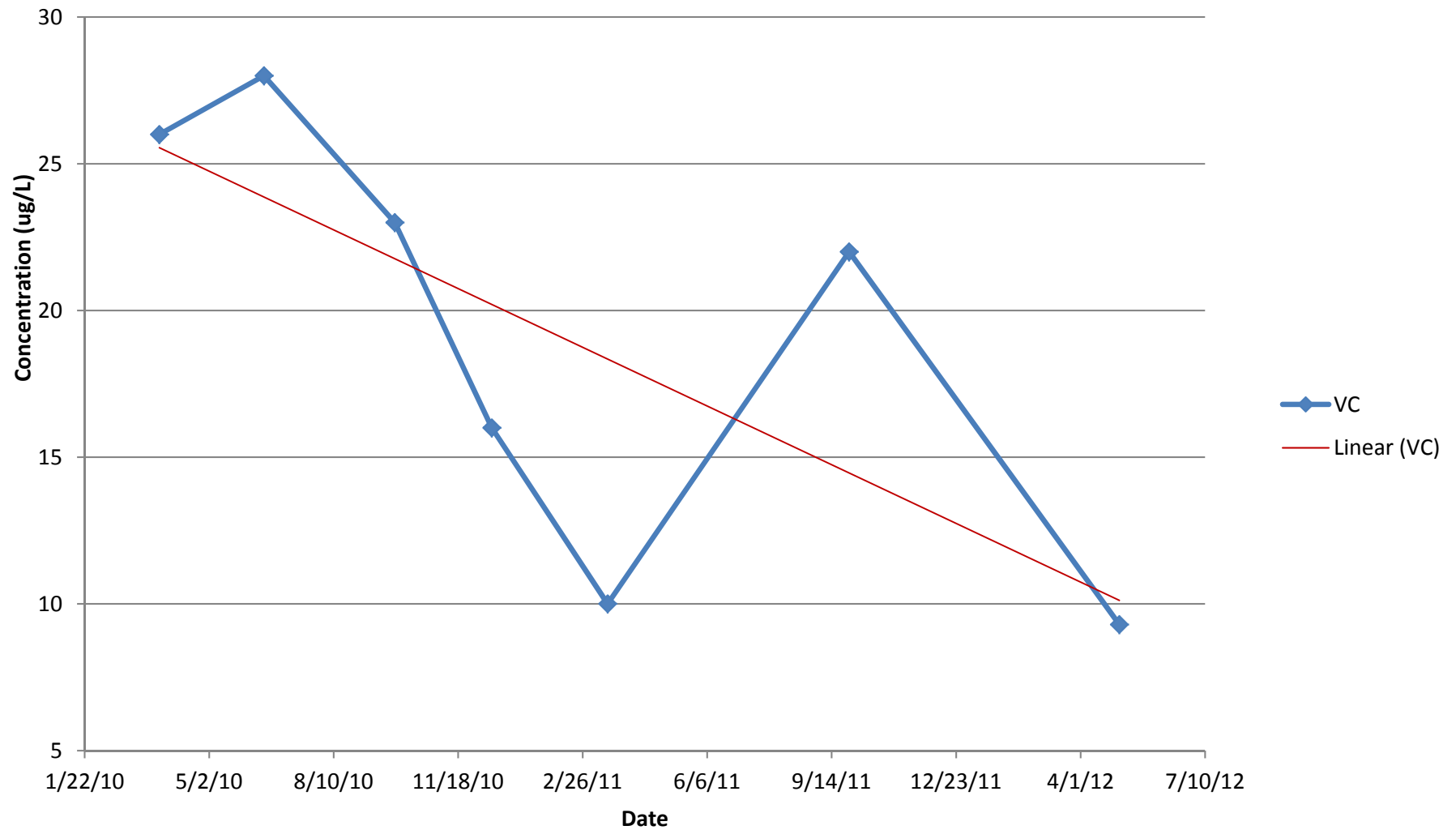
Log \longleftrightarrow Linear

Return to
Input

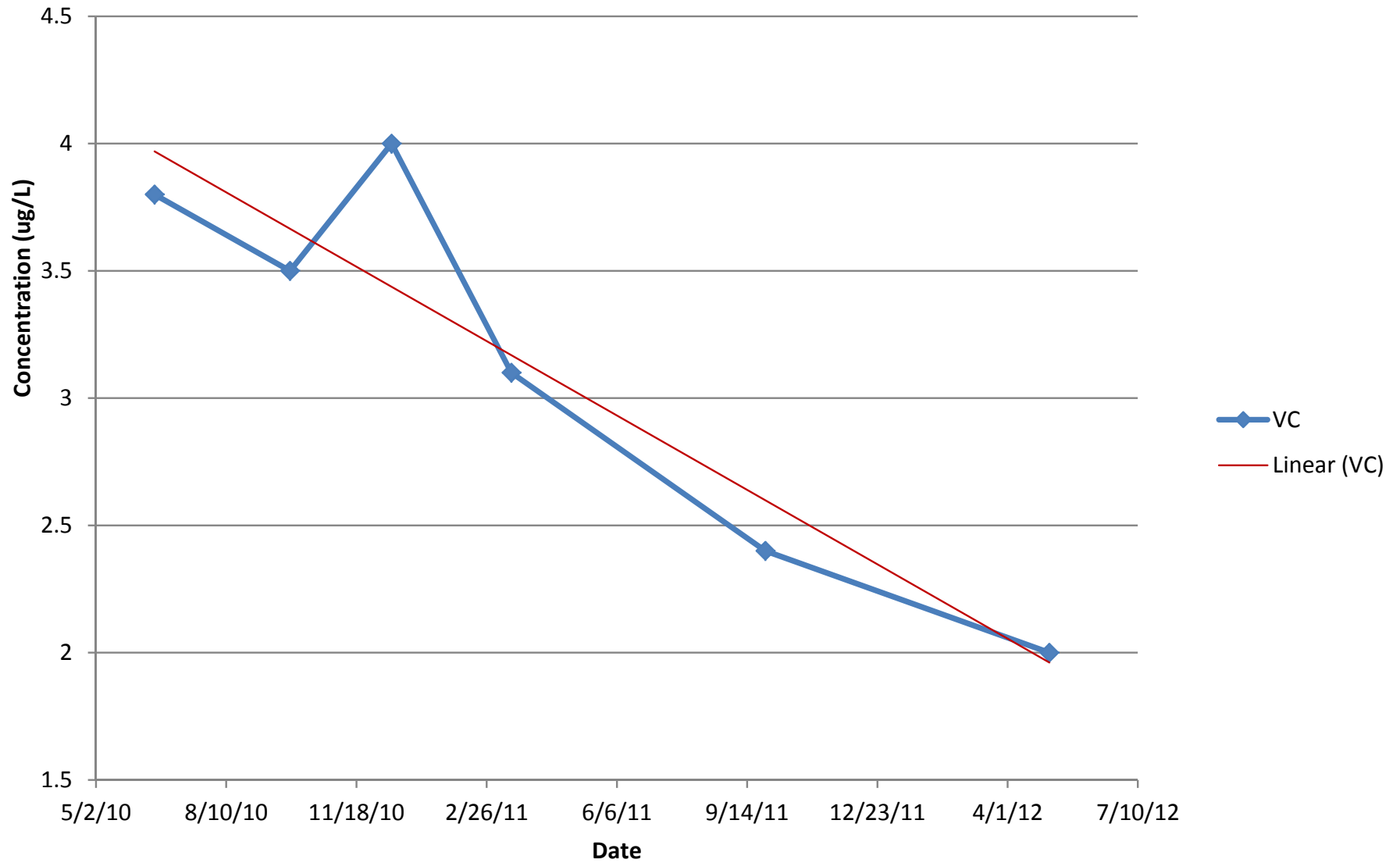
To All

To Array

Vinyl Chloride Concentration in CI-12-30
Shallow Zone - Source Area 1
Capital Area of Investigation



Vinyl Chloride Concentration in CI-14-35
Shallow Zone - Source Area 1
Capital Area of Investigation



APPENDIX I
TERRESTRIAL ECOLOGICAL EVALUATION EXCLUSION

REVISED DRAFT
REMEDIAL INVESTIGATION REPORT

Capital Industries, Inc.
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-004

Terrestrial Ecological Evaluation Process - Primary Exclusions

Documentation Form

Exclusion #	Exclusion Detail	Yes or No?	Are Institutional Controls Required If The Exclusion Applies?
1	Will soil contamination be located at least 6 feet beneath the ground surface and less than 15 feet?	Yes / No	Yes
	Will soil contamination located at least 15 feet beneath the ground surface?	Yes / No	No
	Will soil contamination located below the conditional point of compliance?	Yes / No	Yes
2	Will soil contamination be covered by buildings, paved roads, pavement, or other physical barriers that will prevent plants or wildlife from being exposed?	<input checked="" type="radio"/> Yes / No	Yes
3	Is there less than 1.5 acres of <u>contiguous undeveloped land</u> on the site, or within 500 feet of any area of the site affected by hazardous substances other than those listed in the table of <u>Hazardous Substances of Concern</u> ?	<input checked="" type="radio"/> Yes / No	Other factors determine
	And Is there less than 0.25 acres of <u>contiguous undeveloped land</u> on or within 500 feet of any area of the site affected by hazardous substances listed in the table of <u>Hazardous Substances of Concern</u> ?	Yes / No	
4	Are concentrations of hazardous substances in the soil less than or equal to natural background concentrations of those substances at the point of compliance	Yes / No	No

[\[Exclusions Main\]](#) [\[TEE Definitions\]](#) [\[Simplified or Site-Specific?\]](#) [\[Simplified Ecological Evaluation\]](#) [\[Site-Specific Ecological Evaluation\]](#) [\[WAC 173-340-7493\]](#)

[\[TEE Home\]](#)



LEGEND

— TERRESTRIAL ECOLOGICAL EVALUATION 500 FOOT OFF-SET



0 200
Scale in feet



FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

FIGURE 1

TERRESTRIAL ECOLOGICAL EVALUATION
CAPITAL INDUSTRIES, INC.
SEATTLE, WASHINGTON

FARALLON PN: 457-004

Drawn By:DEW

Checked By:AF

Date:10/4/12

Disk Reference:AERAIL