

Appendix I5

Simulated concentration of tetrachloroethylene (PCE) in finished water at the water treatment plant, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina

Reference: Maslia ML, Suárez-Soto RJ, Wang J, Aral MM, RE Faye, Sautner JB, and Valenzuela C. Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions—Chapter I: Parameter sensitivity, uncertainty, and variability associated with model simulations of groundwater flow, contaminant fate and transport, and distribution of drinking water. Atlanta, GA: Agency for Toxic Substances and Disease Registry; 2008.

Disclaimer: The water-modeling analysis results presented herein are provided as a service to the public for informational purposes. All data, analyses, and computer-simulation results have been reviewed for accuracy and completeness based on available information and current modeling assumptions. The results however, may not reflect the actual exposure of specific individuals to contaminants in the water system. In addition, more updated information, if and when obtained, may change interpretations presented herein. For details pertaining to assumptions and limitations, the public should refer to the aforementioned reference listed above.

Appendix I5. Simulated concentrations of tetrachloroethylene in finished water at the water treatment plant, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[PCE, tetrachloroethylene; µg/L, microgram per liter; P_{2.5}, Monte Carlo simulation results for the 2.5 percentile; P₅₀, Monte Carlo simulation results for the 50 percentile; P_{97.5}, Monte Carlo simulation results for the 97.5 percentile; WTP, water treatment plant; Jan, January; Feb, February; Mar, March; Apr, April; Aug, August; Sept, September; Oct, October; Dec, December]

Stress period	Month and year	Calibrated PCE concentration, in µg/L ¹	Range of concentrations derived from Monte Carlo simulations ²						
			Monte Carlo simulation (Scenario 1) ³			Monte Carlo simulation (Scenario 2) ⁴			
			P _{2.5} ⁵ in µg/L	P ₅₀ ⁶ in µg/L	P _{97.5} ⁷ in µg/L	P _{2.5} ⁸ in µg/L	P ₅₀ ⁹ in µg/L	P _{97.5} ¹⁰ in µg/L	
1-12	Jan–Dec 1951		WTP not operating						
13	Jan 1952	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	Feb 1952	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Mar 1952	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	Apr 1952	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	May 1952	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	June 1952	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	July 1952	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	Aug 1952	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	Sept 1952	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Oct 1952	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	Nov 1952	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	Dec 1952	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	Jan 1953	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	Feb 1953	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	Mar 1953	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	Apr 1953	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	May 1953	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	June 1953	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	July 1953	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	Aug 1953	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	Sept 1953	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	Oct 1953	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	Nov 1953	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	Dec 1953	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	Jan 1954	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	Feb 1954	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	Mar 1954	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	Apr 1954	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	May 1954	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
42	June 1954	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
43	July 1954	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
44	Aug 1954	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	Sept 1954	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
46	Oct 1954	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
47	Nov 1954	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48	Dec 1954	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49	Jan 1955	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	Feb 1955	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51	Mar 1955	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
52	Apr 1955	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
53	May 1955	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
54	June 1955	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.01
55	July 1955	0.01	0.00	0.01	0.02	0.00	0.01	0.01	0.02
56	Aug 1955	0.01	0.00	0.01	0.03	0.00	0.01	0.01	0.02
57	Sept 1955	0.02	0.00	0.01	0.04	0.00	0.01	0.01	0.03
58	Oct 1955	0.03	0.01	0.02	0.05	0.01	0.02	0.02	0.04
59	Nov 1955	0.04	0.01	0.03	0.07	0.01	0.03	0.03	0.07
60	Dec 1955	0.06	0.01	0.04	0.09	0.01	0.03	0.03	0.09

Appendix I5. Simulated concentrations of tetrachloroethylene in finished water at the water treatment plant, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[PCE, tetrachloroethylene; µg/L, microgram per liter; P_{2.5}, Monte Carlo simulation results for the 2.5 percentile; P₅₀, Monte Carlo simulation results for the 50 percentile; P_{97.5}, Monte Carlo simulation results for the 97.5 percentile; WTP, water treatment plant; Jan, January; Feb, February; Mar, March; Apr, April; Aug, August; Sept, September; Oct, October; Dec, December]

Stress period	Month and year	Calibrated PCE concentration, in µg/L ¹	Range of concentrations derived from Monte Carlo simulations ²					
			Monte Carlo simulation (Scenario 1) ³			Monte Carlo simulation (Scenario 2) ⁴		
			P _{2.5} ⁵ in µg/L	P ₅₀ ⁶ in µg/L	P _{97.5} ⁷ in µg/L	P _{2.5} ⁵ in µg/L	P ₅₀ ⁶ in µg/L	P _{97.5} ⁷ in µg/L
61	Jan 1956	0.08	0.02	0.05	0.12	0.02	0.04	0.12
62	Feb 1956	0.10	0.02	0.07	0.16	0.02	0.06	0.15
63	Mar 1956	0.13	0.03	0.09	0.21	0.03	0.08	0.18
64	Apr 1956	0.17	0.04	0.12	0.26	0.04	0.10	0.24
65	May 1956	0.23	0.05	0.15	0.33	0.05	0.12	0.29
66	June 1956	0.29	0.07	0.20	0.42	0.06	0.15	0.34
67	July 1956	0.36	0.09	0.25	0.52	0.08	0.18	0.41
68	Aug 1956	0.46	0.12	0.31	0.65	0.10	0.23	0.51
69	Sept 1956	0.57	0.15	0.38	0.79	0.13	0.29	0.65
70	Oct 1956	0.70	0.18	0.47	0.96	0.16	0.35	0.78
71	Nov 1956	0.85	0.23	0.57	1.16	0.22	0.47	1.03
72	Dec 1956	1.04	0.28	0.69	1.38	0.24	0.54	1.14
73	Jan 1957	1.25	0.35	0.83	1.63	0.31	0.63	1.38
74	Feb 1957	1.47	0.41	0.97	1.89	0.37	0.77	1.69
75	Mar 1957	1.74	0.49	1.16	2.21	0.43	0.88	1.84
76	Apr 1957	2.04	0.59	1.36	2.57	0.53	1.09	2.08
77	May 1957	2.39	0.70	1.59	2.97	0.60	1.20	2.40
78	June 1957	2.77	0.83	1.84	3.40	0.64	1.31	2.51
79	July 1957	3.21	0.98	2.12	3.87	0.74	1.50	3.08
80	Aug 1957	3.69	1.15	2.45	4.42	0.87	1.73	3.38
81	Sept 1957	4.21	1.33	2.80	4.99	1.07	2.11	3.83
82	Oct 1957	4.79	1.54	3.20	5.64	1.20	2.31	4.48
83	Nov 1957	5.41	1.77	3.61	6.32	1.46	2.95	5.33
84	Dec 1957	6.10	2.02	4.08	7.07	1.61	3.08	5.81
85	Jan 1958	6.86	2.29	4.60	7.87	1.81	3.43	6.42
86	Feb 1958	7.60	2.57	5.11	8.67	2.04	3.97	7.10
87	Mar 1958	8.47	2.88	5.71	9.58	2.36	4.36	7.74
88	Apr 1958	9.37	3.22	6.33	10.56	2.68	5.04	8.73
89	May 1958	10.37	3.61	7.02	11.61	2.99	5.37	9.15
90	June 1958	11.39	4.00	7.73	12.67	2.98	5.43	9.32
91	July 1958	12.91	4.59	8.78	14.26	4.03	6.88	11.46
92	Aug 1958	14.12	5.09	9.61	15.49	4.55	7.67	12.57
93	Sept 1958	15.35	5.62	10.47	16.74	4.62	8.07	13.12
94	Oct 1958	16.69	6.19	11.39	18.13	5.24	8.98	14.89
95	Nov 1958	18.03	6.79	12.32	19.54	5.71	9.88	16.33
96	Dec 1958	19.49	7.45	13.33	21.07	6.32	10.83	17.27
97	Jan 1959	20.97	8.11	14.36	22.62	6.84	11.56	18.53
98	Feb 1959	22.35	8.77	15.34	23.97	7.74	12.87	20.40
99	Mar 1959	23.92	9.53	16.47	25.59	7.80	13.07	20.81
100	Apr 1959	25.49	10.24	17.59	27.22	8.26	14.30	23.52
101	May 1959	27.15	11.08	18.81	29.01	8.82	15.02	23.60
102	June 1959	28.81	11.94	20.01	30.78	10.46	16.86	25.74
103	July 1959	30.56	12.79	21.37	32.69	11.14	17.71	27.35
104	Aug 1959	32.36	13.70	22.77	34.63	12.06	18.88	28.65
105	Sept 1959	34.14	14.62	24.11	36.56	12.39	19.29	28.82
106	Oct 1959	36.01	15.60	25.59	38.60	13.35	20.99	31.36
107	Nov 1959	37.85	16.60	27.04	40.57	13.30	22.66	35.03
108	Dec 1959	39.78	17.68	28.50	42.59	14.48	23.99	36.02

Appendix I5. Simulated concentrations of tetrachloroethylene in finished water at the water treatment plant, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[PCE, tetrachloroethylene; µg/L, microgram per liter; P_{2.5}, Monte Carlo simulation results for the 2.5 percentile; P₅₀, Monte Carlo simulation results for the 50 percentile; P_{97.5}, Monte Carlo simulation results for the 97.5 percentile; WTP, water treatment plant; Jan, January; Feb, February; Mar, March; Apr, April; Aug, August; Sept, September; Oct, October; Dec, December]

Stress period	Month and year	Calibrated PCE concentration, in µg/L ¹	Range of concentrations derived from Monte Carlo simulations ²					
			Monte Carlo simulation (Scenario 1) ³			Monte Carlo simulation (Scenario 2) ⁴		
			P _{2.5} ⁵ in µg/L	P ₅₀ ⁵ in µg/L	P _{97.5} ⁵ in µg/L	P _{2.5} ⁵ in µg/L	P ₅₀ ⁵ in µg/L	P _{97.5} ⁵ in µg/L
109	Jan 1960	41.86	18.82	30.15	44.74	15.99	24.99	38.89
110	Feb 1960	43.85	19.92	31.62	46.80	16.98	27.00	41.00
111	Mar 1960	46.03	21.13	33.16	49.07	17.85	26.94	41.01
112	Apr 1960	48.15	22.35	34.81	51.31	18.45	29.03	43.84
113	May 1960	50.37	23.59	36.60	53.65	19.84	30.13	44.48
114	June 1960	52.51	24.80	38.35	55.92	22.20	33.22	47.21
115	July 1960	54.74	26.08	40.12	58.27	23.30	34.55	50.18
116	Aug 1960	56.96	27.37	42.13	60.60	24.49	36.32	51.82
117	Sept 1960	59.09	28.64	43.80	62.82	24.27	35.66	51.64
118	Oct 1960	61.30	29.98	45.51	65.09	26.27	38.51	55.86
119	Nov 1960	63.42	31.31	47.25	67.22	26.43	40.46	59.79
120	Dec 1960	65.61	32.81	48.96	69.64	26.91	43.02	60.66
121	Jan 1961	67.69	34.22	50.74	71.88	28.21	43.30	63.65
122	Feb 1961	69.54	35.52	52.42	73.96	30.97	45.69	70.43
123	Mar 1961	71.56	36.93	54.16	76.28	31.47	45.72	66.14
124	Apr 1961	73.49	38.31	55.82	78.51	32.33	47.92	70.86
125	May 1961	75.49	39.76	57.54	80.74	32.37	49.12	70.32
126	June 1961	77.39	41.04	59.14	82.99	38.28	53.02	73.49
127	July 1961	79.36	42.45	60.87	84.92	36.88	54.13	75.55
128	Aug 1961	81.32	43.86	62.61	86.79	38.78	56.07	77.30
129	Sept 1961	83.19	45.25	64.23	88.82	38.62	54.74	76.56
130	Oct 1961	85.11	46.69	65.85	90.84	40.37	58.11	80.91
131	Nov 1961	86.95	48.10	67.44	92.75	39.55	59.92	87.09
132	Dec 1961	88.84	49.61	69.03	94.71	42.20	62.63	86.40
133	Jan 1962	60.88	34.23	47.47	64.96	27.60	42.46	62.20
134	Feb 1962	62.10	35.17	48.52	66.43	30.36	45.91	68.03
135	Mar 1962	62.94	35.84	49.35	67.26	31.00	45.13	66.06
136	Apr 1962	63.59	36.33	50.10	68.07	32.57	48.08	68.30
137	May 1962	64.17	36.80	50.73	68.98	31.10	46.57	66.06
138	June 1962	64.70	37.21	51.33	69.81	29.45	43.47	61.90
139	July 1962	65.23	37.65	51.82	70.45	28.63	44.36	62.01
140	Aug 1962	65.74	38.07	52.41	71.23	29.87	45.14	64.88
141	Sept 1962	66.22	38.47	52.91	71.97	32.00	47.51	67.91
142	Oct 1962	66.71	38.89	53.53	72.74	30.29	47.30	68.59
143	Nov 1962	67.18	39.30	54.16	73.38	35.13	53.53	77.51
144	Dec 1962	67.65	39.72	54.77	74.05	33.21	50.53	75.06
145	Jan 1963	68.06	40.19	55.24	74.67	32.41	49.74	74.10
146	Feb 1963	68.39	40.63	55.56	75.17	34.46	52.70	77.58
147	Mar 1963	68.73	41.15	56.03	75.76	35.61	52.41	73.73
148	Apr 1963	69.03	41.66	56.47	76.32	36.91	55.39	79.81
149	May 1963	69.33	42.03	56.98	77.17	34.47	53.02	77.36
150	June 1963	69.62	42.25	57.46	77.94	34.18	49.23	70.00
151	July 1963	69.90	42.45	57.98	78.48	32.75	49.62	71.03
152	Aug 1963	70.17	42.67	58.43	79.00	34.06	51.05	73.06
153	Sept 1963	70.43	42.87	58.82	79.47	36.62	52.90	76.53
154	Oct 1963	70.69	43.17	59.15	79.90	36.26	52.47	77.15
155	Nov 1963	70.93	43.60	59.49	80.31	38.46	59.09	84.58
156	Dec 1963	71.17	43.90	59.88	80.88	36.71	56.06	80.60

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[PCE, tetrachloroethylene; µg/L, microgram per liter; P_{2.5}, Monte Carlo simulation results for the 2.5 percentile; P₅₀, Monte Carlo simulation results for the 50 percentile; P_{97.5}, Monte Carlo simulation results for the 97.5 percentile; WTP, water treatment plant; Jan, January; Feb, February; Mar, March; Apr, April; Aug, August; Sept, September; Oct, October; Dec, December]

Stress period	Month and year	Calibrated PCE concentration, in µg/L ¹	Range of concentrations derived from Monte Carlo simulations ²					
			Monte Carlo simulation (Scenario 1) ³			Monte Carlo simulation (Scenario 2) ⁴		
			P _{2.5} ⁵ in µg/L	P ₅₀ ⁵ in µg/L	P _{97.5} ⁵ in µg/L	P _{2.5} ⁵ in µg/L	P ₅₀ ⁵ in µg/L	P _{97.5} ⁵ in µg/L
157	Jan 1964	71.40	44.18	60.32	81.34	35.81	55.22	80.71
158	Feb 1964	63.77	39.66	54.00	72.84	37.51	58.47	83.80
159	Mar 1964	63.95	39.92	54.36	73.38	37.37	57.84	81.58
160	Apr 1964	64.08	40.09	54.68	73.85	40.30	60.39	85.06
161	May 1964	64.19	40.31	54.98	74.28	39.56	57.23	84.15
162	June 1964	64.27	40.51	55.23	74.64	37.14	53.54	75.21
163	July 1964	64.34	40.61	55.45	74.98	35.59	54.24	76.87
164	Aug 1964	64.39	40.68	55.64	75.27	37.29	55.12	77.08
165	Sept 1964	64.43	40.75	55.82	75.62	39.55	57.96	80.84
166	Oct 1964	64.47	40.81	56.00	75.94	38.57	56.64	78.51
167	Nov 1964	64.49	40.88	56.18	76.19	42.49	63.10	91.13
168	Dec 1964	64.50	40.96	56.36	76.45	39.06	59.01	88.36
169	Jan 1965	64.50	41.10	56.58	76.70	37.87	59.05	88.52
170	Feb 1965	64.49	41.12	56.70	76.94	39.46	61.35	94.71
171	Mar 1965	64.47	41.14	56.78	77.17	41.20	60.99	89.98
172	Apr 1965	64.45	41.16	56.92	77.24	42.66	64.07	93.10
173	May 1965	64.42	41.20	57.06	77.13	41.03	61.17	87.07
174	June 1965	64.38	41.23	57.20	77.34	36.64	56.23	81.33
175	July 1965	64.33	41.26	57.22	77.80	38.15	57.32	81.83
176	Aug 1965	64.27	41.14	57.22	77.91	38.93	57.04	84.04
177	Sept 1965	64.20	41.03	57.22	77.92	41.40	60.36	84.29
178	Oct 1965	64.13	40.92	57.30	78.03	38.84	59.61	87.79
179	Nov 1965	64.05	40.85	57.34	78.10	44.47	66.00	95.45
180	Dec 1965	63.97	40.78	57.39	78.10	39.95	61.88	91.31
181	Jan 1966	63.88	40.81	57.48	78.26	39.34	61.61	91.59
182	Feb 1966	63.79	40.88	57.54	78.38	42.06	64.63	99.81
183	Mar 1966	63.68	41.01	57.62	78.45	41.44	63.87	94.47
184	Apr 1966	63.57	41.20	57.61	78.33	43.72	66.91	97.21
185	May 1966	63.46	41.28	57.64	78.43	42.05	64.21	91.37
186	June 1966	63.34	41.40	57.70	78.44	38.28	58.86	86.56
187	July 1966	63.21	41.54	57.70	78.65	39.70	58.20	87.29
188	Aug 1966	63.08	41.69	57.74	78.94	39.57	60.11	87.73
189	Sept 1966	62.94	41.79	57.79	78.91	41.82	62.94	91.60
190	Oct 1966	62.80	41.73	57.82	78.87	40.67	60.35	90.52
191	Nov 1966	62.65	41.67	57.78	78.78	44.43	68.76	99.82
192	Dec 1966	62.50	41.60	57.82	78.70	40.92	63.19	97.26
193	Jan 1967	62.25	41.42	57.70	78.67	40.95	62.45	96.88
194	Feb 1967	61.99	41.20	57.61	78.56	41.00	66.51	98.39
195	Mar 1967	61.67	40.98	57.36	78.37	43.47	64.42	95.01
196	Apr 1967	61.35	40.74	57.12	78.11	44.75	66.63	97.65
197	May 1967	61.02	40.52	56.84	77.78	42.71	64.23	95.11
198	June 1967	60.69	40.22	56.65	77.54	38.89	58.53	86.55
199	July 1967	60.37	40.03	56.43	77.45	38.46	59.64	87.57
200	Aug 1967	60.05	39.87	56.26	77.39	39.01	59.72	89.18
201	Sept 1967	59.74	39.69	56.04	77.26	40.93	61.91	90.19
202	Oct 1967	59.43	39.49	55.86	77.12	40.30	60.56	90.27
203	Nov 1967	59.13	39.31	55.71	76.98	44.01	68.01	99.90
204	Dec 1967	58.83	39.12	55.50	76.83	41.94	63.60	97.99

Appendix I5. Simulated concentrations of tetrachloroethylene in finished water at the water treatment plant, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[PCE, tetrachloroethylene; µg/L, microgram per liter; P_{2.5}, Monte Carlo simulation results for the 2.5 percentile; P₅₀, Monte Carlo simulation results for the 50 percentile; P_{97.5}, Monte Carlo simulation results for the 97.5 percentile; WTP, water treatment plant; Jan, January; Feb, February; Mar, March; Apr, April; Aug, August; Sept, September; Oct, October; Dec, December]

Stress period	Month and year	Calibrated PCE concentration, in µg/L ¹	Range of concentrations derived from Monte Carlo simulations ²					
			Monte Carlo simulation (Scenario 1) ³			Monte Carlo simulation (Scenario 2) ⁴		
			P _{2.5} ⁵ in µg/L	P ₅₀ ⁵ in µg/L	P _{97.5} ⁵ in µg/L	P _{2.5} ⁵ in µg/L	P ₅₀ ⁵ in µg/L	P _{97.5} ⁵ in µg/L
205	Jan 1968	58.41	38.91	55.32	76.43	40.60	63.04	98.22
206	Feb 1968	57.95	38.69	55.12	75.94	39.51	63.91	98.67
207	Mar 1968	57.43	38.44	54.74	75.51	41.62	63.54	94.21
208	Apr 1968	56.94	38.22	54.56	75.12	42.61	65.79	99.98
209	May 1968	56.45	37.99	54.20	74.61	39.39	62.35	92.79
210	June 1968	55.98	37.72	53.86	74.13	37.49	57.23	84.15
211	July 1968	55.49	37.46	53.50	73.63	37.51	56.92	83.56
212	Aug 1968	55.02	37.31	53.27	73.27	37.52	58.08	84.83
213	Sept 1968	54.58	37.16	53.00	73.05	40.06	60.24	89.84
214	Oct 1968	54.13	36.94	52.72	72.83	37.61	59.46	87.96
215	Nov 1968	53.71	36.71	52.49	72.61	42.84	64.11	96.77
216	Dec 1968	53.28	36.45	52.16	72.34	39.36	60.93	93.74
217	Jan 1969	53.07	36.40	52.03	72.40	37.42	60.60	90.38
218	Feb 1969	52.97	36.41	52.07	72.32	38.68	63.83	100.33
219	Mar 1969	52.94	36.41	52.21	72.23	40.85	62.20	90.15
220	Apr 1969	52.93	36.50	52.33	72.58	41.71	63.74	95.37
221	May 1969	52.93	36.55	52.41	72.94	40.51	60.54	94.64
222	June 1969	52.92	36.59	52.49	73.24	37.99	56.86	82.85
223	July 1969	52.90	36.61	52.54	73.52	35.02	57.32	85.75
224	Aug 1969	52.86	36.63	52.71	73.77	36.90	57.85	85.34
225	Sept 1969	52.81	36.64	52.74	73.98	39.74	59.97	89.19
226	Oct 1969	52.75	36.64	52.75	74.13	37.64	59.44	92.22
227	Nov 1969	55.19	38.34	55.24	77.72	36.74	55.89	84.87
228	Dec 1969	55.19	38.30	55.23	77.70	32.94	51.96	81.13
229	Jan 1970	55.01	38.10	55.14	77.54	32.78	50.97	81.62
230	Feb 1970	54.79	37.97	55.03	77.34	33.13	52.80	83.08
231	Mar 1970	54.49	37.71	54.76	77.08	32.85	52.72	79.35
232	Apr 1970	54.20	37.46	54.48	76.72	34.85	54.22	82.26
233	May 1970	53.90	37.21	54.17	76.27	33.91	51.26	78.11
234	June 1970	53.61	37.01	53.91	75.89	29.54	47.08	71.71
235	July 1970	53.32	36.82	53.59	75.68	28.77	46.80	72.48
236	Aug 1970	53.04	36.64	53.32	75.44	29.60	47.37	70.90
237	Sept 1970	52.78	36.47	53.06	75.25	31.55	49.00	74.82
238	Oct 1970	52.53	36.31	52.78	75.02	30.14	48.10	73.55
239	Nov 1970	52.29	36.19	52.67	74.93	32.50	53.01	81.51
240	Dec 1970	52.05	36.05	52.54	74.88	32.47	48.94	76.35
241	Jan 1971	51.96	35.96	52.53	75.02	30.00	48.86	77.29
242	Feb 1971	51.93	35.90	52.50	75.19	32.51	50.78	80.73
243	Mar 1971	51.95	35.87	52.60	75.42	32.25	49.82	78.27
244	Apr 1971	51.99	35.86	52.73	75.65	32.74	52.65	81.01
245	May 1971	52.03	35.86	52.88	75.88	30.15	49.32	76.96
246	June 1971	52.08	35.85	52.86	76.11	29.02	45.87	72.87
247	July 1971	52.12	35.92	52.88	76.35	29.03	45.64	72.37
248	Aug 1971	52.16	35.93	52.97	76.52	29.30	46.61	71.75
249	Sept 1971	52.20	35.93	53.07	76.72	30.33	48.38	74.56
250	Oct 1971	52.23	35.95	53.13	76.91	29.27	46.98	73.25
251	Nov 1971	52.26	35.98	53.25	77.05	32.40	52.55	82.47
252	Dec 1971	52.29	35.91	53.28	77.28	30.91	49.57	76.35

Appendix I5. Simulated concentrations of tetrachloroethylene in finished water at the water treatment plant, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[PCE, tetrachloroethylene; µg/L, microgram per liter; P_{2.5}, Monte Carlo simulation results for the 2.5 percentile; P₅₀, Monte Carlo simulation results for the 50 percentile; P_{97.5}, Monte Carlo simulation results for the 97.5 percentile; WTP, water treatment plant; Jan, January; Feb, February; Mar, March; Apr, April; Aug, August; Sept, September; Oct, October; Dec, December]

Stress period	Month and year	Calibrated PCE concentration, in µg/L ¹	Range of concentrations derived from Monte Carlo simulations ²					
			Monte Carlo simulation (Scenario 1) ³			Monte Carlo simulation (Scenario 2) ⁴		
			P _{2.5} ⁵ in µg/L	P ₅₀ ⁵ in µg/L	P _{97.5} ⁵ in µg/L	P _{2.5} ⁵ in µg/L	P ₅₀ ⁵ in µg/L	P _{97.5} ⁵ in µg/L
253	Jan 1972	49.34	33.93	50.30	73.12	29.17	48.14	77.82
254	Feb 1972	49.01	33.72	50.06	72.93	30.19	50.33	81.13
255	Mar 1972	48.68	33.47	49.71	72.72	31.69	48.44	75.80
256	Apr 1972	48.40	33.25	49.54	72.47	30.79	50.77	79.48
257	May 1972	48.14	33.10	49.27	72.26	30.44	48.53	73.97
258	June 1972	47.90	32.98	49.08	72.17	27.68	44.98	68.87
259	July 1972	47.67	32.85	48.97	72.02	27.13	43.58	66.62
260	Aug 1972	47.45	32.72	48.78	71.78	26.91	43.63	68.46
261	Sept 1972	47.25	32.60	48.69	71.47	28.10	46.38	72.80
262	Oct 1972	47.05	32.49	48.58	71.34	28.15	44.90	70.07
263	Nov 1972	46.87	32.41	48.43	71.26	30.68	49.80	78.83
264	Dec 1972	46.69	32.29	48.21	71.16	28.36	46.21	76.56
265	Jan 1973	54.28	37.52	56.04	82.79	27.54	44.70	72.51
266	Feb 1973	54.19	37.39	55.96	82.69	29.05	47.31	78.50
267	Mar 1973	53.98	37.15	55.78	82.35	28.09	46.20	73.11
268	Apr 1973	53.76	36.91	55.44	81.94	28.95	46.73	77.52
269	May 1973	53.52	36.68	55.24	81.51	26.12	45.17	70.36
270	June 1973	53.30	36.46	55.22	81.10	25.61	40.75	66.70
271	July 1973	53.08	36.24	55.12	80.74	25.25	40.82	63.84
272	Aug 1973	52.87	36.03	54.99	80.59	25.02	41.47	64.39
273	Sept 1973	52.68	35.84	54.88	80.46	26.43	43.33	68.68
274	Oct 1973	52.51	35.66	54.87	80.34	26.17	41.28	65.28
275	Nov 1973	52.35	35.49	54.80	80.25	27.77	45.41	72.92
276	Dec 1973	52.20	35.33	54.72	80.17	25.66	42.21	68.89
277	Jan 1974	52.43	35.41	54.97	80.49	25.72	42.62	69.65
278	Feb 1974	52.82	35.59	55.42	80.98	26.19	43.80	72.53
279	Mar 1974	53.39	35.86	55.92	81.66	25.08	42.86	68.49
280	Apr 1974	53.99	36.16	56.60	82.41	28.14	45.59	71.28
281	May 1974	54.63	36.49	57.21	83.20	25.84	42.70	72.49
282	June 1974	55.25	36.80	57.69	84.15	25.00	40.00	64.50
283	July 1974	55.90	37.13	58.15	85.07	24.17	40.57	65.57
284	Aug 1974	56.53	37.50	58.85	85.98	24.29	40.75	65.98
285	Sept 1974	57.10	37.85	59.43	86.86	27.22	43.16	69.98
286	Oct 1974	57.70	38.22	60.00	87.74	25.22	42.68	67.27
287	Nov 1974	58.30	38.56	60.59	88.58	28.99	47.52	76.53
288	Dec 1974	58.92	38.98	61.11	89.45	25.07	44.15	72.46
289	Jan 1975	61.00	40.30	63.17	92.62	27.61	45.83	75.73
290	Feb 1975	61.24	40.39	63.33	92.97	28.46	48.17	80.43
291	Mar 1975	61.41	40.51	63.43	93.20	28.98	46.39	77.50
292	Apr 1975	61.57	40.61	63.45	93.38	29.37	48.59	82.56
293	May 1975	61.72	40.78	63.62	93.32	28.00	46.55	76.49
294	June 1975	61.88	40.92	63.77	93.48	24.95	42.93	67.44
295	July 1975	62.05	41.05	64.04	93.91	25.59	42.20	68.93
296	Aug 1975	62.25	41.13	64.22	94.27	26.21	42.72	68.78
297	Sept 1975	62.46	41.20	64.36	94.54	25.88	44.92	73.09
298	Oct 1975	62.69	41.18	64.65	94.84	26.24	43.56	70.58
299	Nov 1975	62.92	41.12	64.91	95.15	27.40	49.02	80.06
300	Dec 1975	63.18	41.12	65.11	95.44	26.23	45.41	76.07

Appendix I5. Simulated concentrations of tetrachloroethylene in finished water at the water treatment plant, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[PCE, tetrachloroethylene; µg/L, microgram per liter; P_{2.5}, Monte Carlo simulation results for the 2.5 percentile; P₅₀, Monte Carlo simulation results for the 50 percentile; P_{97.5}, Monte Carlo simulation results for the 97.5 percentile; WTP, water treatment plant; Jan, January; Feb, February; Mar, March; Apr, April; Aug, August; Sept, September; Oct, October; Dec, December]

Stress period	Month and year	Calibrated PCE concentration, in µg/L ¹	Range of concentrations derived from Monte Carlo simulations ²					
			Monte Carlo simulation (Scenario 1) ³			Monte Carlo simulation (Scenario 2) ⁴		
			P _{2.5} ⁵ in µg/L	P ₅₀ ⁵ in µg/L	P _{97.5} ⁵ in µg/L	P _{2.5} ⁵ in µg/L	P ₅₀ ⁵ in µg/L	P _{97.5} ⁵ in µg/L
301	Jan 1976	73.96	48.06	76.13	111.62	27.44	47.37	78.75
302	Feb 1976	74.94	48.64	77.01	112.96	28.08	50.08	82.73
303	Mar 1976	75.97	49.28	77.88	114.29	30.00	49.48	77.65
304	Apr 1976	76.97	49.90	78.87	115.66	29.89	51.83	83.45
305	May 1976	78.00	50.66	79.94	117.25	28.96	49.32	81.75
306	June 1976	79.02	51.42	80.86	118.78	27.37	44.69	74.98
307	July 1976	80.07	52.20	81.82	120.35	28.29	45.16	75.62
308	Aug 1976	81.13	52.86	82.70	121.82	27.95	46.57	76.48
309	Sept 1976	82.17	53.51	83.71	123.46	29.17	49.14	79.62
310	Oct 1976	83.25	54.25	84.81	124.74	28.92	48.10	80.30
311	Nov 1976	84.31	55.09	85.76	126.00	31.09	53.61	90.47
312	Dec 1976	85.41	55.90	86.67	127.61	28.21	50.51	82.95
313	Jan 1977	86.61	56.70	87.66	129.36	28.88	49.71	81.57
314	Feb 1977	87.70	57.45	88.70	131.09	30.18	52.13	85.43
315	Mar 1977	88.91	58.14	89.80	133.02	29.18	51.65	83.61
316	Apr 1977	90.10	58.86	90.90	134.30	32.23	54.40	88.91
317	May 1977	91.32	59.61	91.86	135.48	30.43	50.86	86.19
318	June 1977	92.53	60.38	93.08	136.61	28.97	47.43	78.24
319	July 1977	93.75	61.24	94.29	137.80	29.03	47.45	77.48
320	Aug 1977	94.99	62.11	95.48	139.43	28.20	48.28	81.51
321	Sept 1977	96.20	62.97	96.44	140.89	30.24	50.29	85.19
322	Oct 1977	97.42	63.86	97.49	142.51	28.33	51.14	82.53
323	Nov 1977	98.62	64.58	98.62	144.08	32.33	56.02	92.86
324	Dec 1977	99.84	65.31	99.65	145.59	29.86	53.22	90.47
325	Jan 1978	101.18	66.16	101.09	147.13	44.02	75.70	120.92
326	Feb 1978	102.77	67.25	102.62	148.91	39.93	67.26	112.31
327	Mar 1978	103.04	67.39	103.04	149.08	52.50	84.64	133.87
328	Apr 1978	104.31	68.24	104.52	150.32	46.79	76.94	126.94
329	May 1978	105.19	68.81	105.34	151.12	50.49	85.95	136.76
330	June 1978	106.88	70.00	107.10	153.19	42.45	73.13	119.19
331	July 1978	107.95	70.77	108.05	154.56	45.08	75.24	121.43
332	Aug 1978	108.69	71.12	108.58	155.63	48.54	80.46	135.92
333	Sept 1978	109.61	71.68	109.40	156.91	48.81	83.51	139.85
334	Oct 1978	111.18	72.89	110.78	158.60	44.55	75.04	121.83
335	Nov 1978	111.08	72.99	110.76	158.33	59.23	100.40	162.58
336	Dec 1978	111.93	73.52	111.71	159.48	58.45	100.01	162.64
337	Jan 1979	113.14	74.30	112.93	161.01	57.81	95.20	164.77
338	Feb 1979	114.05	74.80	113.75	162.04	58.23	99.50	166.62
339	Mar 1979	114.98	75.32	114.60	163.14	59.21	101.26	162.26
340	Apr 1979	115.82	76.01	115.14	164.14	64.03	105.77	169.77
341	May 1979	116.68	76.83	115.85	165.22	60.49	104.49	166.33
342	June 1979	117.47	77.56	116.62	166.12	57.29	95.08	158.63
343	July 1979	118.29	78.22	117.32	166.52	60.76	97.83	159.43
344	Aug 1979	119.08	78.87	117.95	167.11	60.40	101.30	162.28
345	Sept 1979	119.83	79.50	118.62	167.82	67.04	105.09	167.67
346	Oct 1979	120.59	80.14	119.49	168.59	63.07	104.48	172.01
347	Nov 1979	121.31	80.74	120.12	169.34	74.24	119.14	191.45
348	Dec 1979	122.04	81.35	120.77	170.09	68.90	113.89	186.42

Appendix 15. Simulated concentrations of tetrachloroethylene in finished water at the water treatment plant, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[PCE, tetrachloroethylene; µg/L, microgram per liter; P_{2.5}, Monte Carlo simulation results for the 2.5 percentile; P₅₀, Monte Carlo simulation results for the 50 percentile; P_{97.5}, Monte Carlo simulation results for the 97.5 percentile; WTP, water treatment plant; Jan, January; Feb, February; Mar, March; Apr, April; Aug, August; Sept, September; Oct, October; Dec, December]

Stress period	Month and year	Calibrated PCE concentration, in µg/L ¹	Range of concentrations derived from Monte Carlo simulations ²					
			Monte Carlo simulation (Scenario 1) ³			Monte Carlo simulation (Scenario 2) ⁴		
			P _{2.5} ⁵ in µg/L	P ₅₀ ⁶ in µg/L	P _{97.5} ⁷ in µg/L	P _{2.5} ⁵ in µg/L	P ₅₀ ⁶ in µg/L	P _{97.5} ⁷ in µg/L
349	Jan 1980	123.28	82.20	122.09	171.34	61.30	101.54	159.81
350	Feb 1980	122.98	81.93	121.80	171.45	77.70	131.23	206.13
351	Mar 1980	124.03	82.63	122.99	172.63	67.73	114.94	183.21
352	Apr 1980	123.90	82.42	123.27	172.41	86.02	143.61	229.05
353	May 1980	124.69	82.89	123.73	173.81	85.23	138.95	220.28
354	June 1980	125.83	83.92	124.67	175.54	80.14	128.55	203.28
355	July 1980	0.72	0.10	0.43	1.67	0.06	0.32	1.22
356	Aug 1980	0.75	0.11	0.45	1.73	0.07	0.34	1.28
357	Sept 1980	121.36	80.64	120.61	170.25	74.54	128.20	195.86
358	Oct 1980	121.72	80.95	121.00	170.55	82.88	137.09	215.09
359	Nov 1980	122.14	81.32	121.73	171.07	89.83	145.35	231.15
360	Dec 1980	122.95	81.96	122.56	171.97	87.97	143.51	226.80
361	Jan 1981	114.05	76.20	113.83	159.33	81.35	131.65	210.19
362	Feb 1981	114.39	76.42	114.22	159.76	71.73	120.32	185.47
363	Mar 1981	115.60	77.32	115.10	161.62	65.38	104.23	164.75
364	Apr 1981	116.55	78.07	116.07	163.34	61.89	101.55	158.35
365	May 1981	117.30	78.64	116.91	164.52	63.14	99.62	156.29
366	June 1981	118.36	79.53	117.92	165.37	54.95	86.73	140.98
367	July 1981	133.29	89.77	132.96	186.08	58.22	92.47	142.21
368	Aug 1981	134.31	90.57	133.94	187.73	59.68	95.47	151.17
369	Sept 1981	120.72	81.40	120.32	168.91	58.90	98.56	150.82
370	Oct 1981	121.04	81.71	120.86	169.57	61.42	99.80	157.59
371	Nov 1981	121.41	82.04	121.17	170.30	60.76	101.36	158.08
372	Dec 1981	121.81	82.41	121.56	171.08	63.30	102.27	160.36
373	Jan 1982	103.95	70.61	103.86	145.41	55.35	91.05	141.55
374	Feb 1982	105.86	71.96	105.76	147.68	56.60	92.63	140.40
375	Mar 1982	107.52	73.05	107.51	149.67	59.57	93.91	147.10
376	Apr 1982	108.83	74.01	108.79	151.25	58.43	97.00	147.50
377	May 1982	148.50	101.45	147.91	206.23	66.65	107.89	166.05
378	June 1982	110.78	75.70	110.41	153.60	61.01	99.03	151.27
379	July 1982	111.98	76.77	111.69	154.90	62.24	97.91	154.37
380	Aug 1982	113.07	77.74	112.66	156.03	63.70	99.09	152.90
381	Sept 1982	114.04	78.49	113.60	157.00	65.21	100.91	153.98
382	Oct 1982	114.60	79.03	114.14	157.69	67.41	108.99	165.07
383	Nov 1982	113.87	78.41	113.67	157.37	88.82	142.12	223.75
384	Dec 1982	115.16	79.21	114.95	158.89	79.98	128.05	193.75
385	Jan 1983	1.25	0.25	0.75	2.48	0.17	0.61	1.90
386	Feb 1983	1.29	0.27	0.78	2.56	0.18	0.63	1.94
387	Mar 1983	111.76	77.09	112.19	156.29	78.57	123.82	194.41
388	Apr 1983	112.66	77.92	112.99	157.31	74.18	119.77	182.63
389	May 1983	113.97	79.21	114.10	158.82	70.85	117.76	174.86
390	June 1983	106.10	74.18	106.03	147.67	68.30	103.53	162.13
391	July 1983	116.70	81.48	116.62	162.17	66.41	108.10	166.88
392	Aug 1983	117.72	82.09	117.54	163.39	67.97	107.12	161.29
393	Sept 1983	117.83	82.03	117.63	163.40	76.74	120.27	183.16
394	Oct 1983	117.97	82.03	117.88	163.53	84.95	133.04	207.24
395	Nov 1983	118.63	82.60	118.70	164.81	89.04	142.71	224.56
396	Dec 1983	120.78	84.23	120.74	167.35	72.65	113.38	171.38

Appendix I5. Simulated concentrations of tetrachloroethylene in finished water at the water treatment plant, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[PCE, tetrachloroethylene; µg/L, microgram per liter; P_{2.5}, Monte Carlo simulation results for the 2.5 percentile; P₅₀, Monte Carlo simulation results for the 50 percentile; P_{97.5}, Monte Carlo simulation results for the 97.5 percentile; WTP, water treatment plant; Jan, January; Feb, February; Mar, March; Apr, April; Aug, August; Sept, September; Oct, October; Dec, December]

Stress period	Month and year	Calibrated PCE concentration, in µg/L ¹	Range of concentrations derived from Monte Carlo simulations ²					
			Monte Carlo simulation (Scenario 1) ³			Monte Carlo simulation (Scenario 2) ⁴		
			P _{2.5} ⁵ in µg/L	P ₅₀ ⁵ in µg/L	P _{97.5} ⁵ in µg/L	P _{2.5} ⁵ in µg/L	P ₅₀ ⁵ in µg/L	P _{97.5} ⁵ in µg/L
397	Jan 1984	132.87	92.63	133.27	185.03	103.04	159.84	247.01
398	Feb 1984	180.39	126.52	180.97	249.43	94.25	150.35	230.69
399	Mar 1984	183.02	128.61	183.55	252.50	99.38	159.70	240.42
400	Apr 1984	151.46	106.37	151.54	208.97	97.90	155.71	236.45
401	May 1984	153.42	107.63	153.20	211.58	92.85	146.63	220.85
402	June 1984	182.13	127.45	181.99	250.57	94.11	152.75	228.36
403	July 1984	156.39	109.41	156.40	214.58	101.95	160.97	234.39
404	Aug 1984	170.47	106.73	158.25	238.65	108.76	168.54	261.54
405	Sept 1984	181.22	113.28	168.51	253.93	117.53	184.30	295.64
406	Oct 1984	173.73	108.42	161.84	245.02	120.12	182.33	281.84
407	Nov 1984	173.77	108.41	161.92	245.70	124.18	187.60	287.36
408	Dec 1984	173.18	107.82	161.69	246.06	127.85	193.50	301.23
409	Jan 1985	176.12	109.98	164.71	251.48	122.98	187.00	293.19
410	Feb 1985	3.64	1.13	2.67	6.57	0.47	1.41	3.74
411	Mar 1985	8.71	3.21	6.58	14.79	8.83	20.01	41.59
412	Apr 1985	8.09	2.99	6.16	13.70	9.00	20.41	42.30
413	May 1985	4.76	1.50	3.46	8.36	0.58	1.68	4.47
414	June 1985	5.14	1.65	3.80	9.21	0.64	1.81	4.78
415	July 1985	5.54	1.80	4.12	10.04	0.69	1.96	5.12
416	Aug 1985	6.01	1.98	4.50	10.97	0.76	2.14	5.56
417	Sept 1985	6.50	2.19	4.88	11.89	0.83	2.30	6.03
418	Oct 1985	7.06	2.43	5.33	12.88	0.92	2.53	6.53
419	Nov 1985	7.64	2.68	5.78	13.90	1.02	2.76	7.07
420	Dec 1985	8.27	2.93	6.32	14.99	1.13	3.00	7.59
421	Jan 1986	8.85	3.18	6.82	15.87	1.24	3.22	8.14
422	Feb 1986	9.42	3.45	7.30	16.67	1.35	3.46	8.69
423	Mar 1986	12.14	4.55	9.43	21.18	1.85	4.67	11.50
424	Apr 1986	10.83	4.09	8.44	18.71	1.64	4.08	9.90
425	May 1986	11.56	4.42	9.06	19.63	1.79	4.41	10.49
426	June 1986	12.28	4.77	9.70	20.59	1.94	4.76	11.08
427	July 1986	13.06	5.14	10.35	21.75	2.11	5.12	11.77
428	Aug 1986	13.84	5.54	11.01	23.04	2.29	5.51	12.50
429	Sept 1986	14.61	5.90	11.70	24.30	2.49	5.89	13.19
430	Oct 1986	15.42	6.28	12.41	25.59	2.71	6.33	13.94
431	Nov 1986	16.21	6.66	13.11	26.70	2.93	6.73	14.77
432	Dec 1986	17.03	7.06	13.77	27.86	3.17	7.20	15.65
433	Jan 1987	17.85	7.47	14.46	29.04	3.41	7.66	16.46
434	Feb 1987	18.49	7.82	15.02	29.91	3.62	8.04	17.16
435	Mar 1987				WTP closed			

¹Results from Faye (2008) and reported in Maslia et al. (2007, Appendix A2)

²P_{97.5} and P_{2.5} represent the upper and lower bound, respectively, of 95 percent of Monte Carlo simulations; for a Gaussian (normal) distribution, the median (P₅₀) should equal the mean value

³Scenario 1 Monte Carlo simulation is for pumping uncertainty excluded

⁴Scenario 2 Monte Carlo simulation is for pumping uncertainty included