

Table 3. Concentrations of selected volatile organic compounds in ground-water samples from monitoring wells and piezometers at Operable Unit 1, Naval Undersea Warfare Center, Division Keyport, Washington, 1999–2006.

[Data collected by the U.S. Geological Survey. Shaded rows indicate 2006 data. All other data were published in Dinicola and others (2002), Dinicola (2003, 2004), and Dinicola and Huffman (2004). Reported concentrations less than the detection limit are estimated. Laboratory data qualifier codes, such as “D” for dilution, are not shown. **Study site No.:** Location of study sites are shown in figure 2. MW, monitoring well; P, piezometer. **Volatile organic compounds (VOCs):** PCE, tetrachloroethene; TCE, trichloroethene; *cis*-DCE, *cis*-1,2-dichloroethene; *trans*-DCE, *trans*-1,2-dichloroethene; VC, vinyl chloride; 1,1,1-TCA, 1,1,1-trichloroethane; 1,1-DCA, 1,1-dichloroethane; CA, chloroethane; 1,1-DCE, 1,1-dichloroethene; total BTEX, sum of benzene, toluene, ethylbenzene, and xylene; Total CVOCs, sum of chlorinated volatile organic compounds. Methane data are presented for diffusion samplers only. **Abbreviations:** E, estimated value; µg/L, microgram per liter; <, actual value is less than value shown; nd, not detected; –, not analyzed]

Study site No.	Date sampled	PCE (µg/L)	TCE (µg/L)	<i>cis</i> -DCE (µg/L)	<i>trans</i> -DCE (µg/L)	VC (µg/L)	Ethane (µg/L)	Ethene (µg/L)
Upgradient								
MW1-3	06-15-04	–	–	–	–	–	<5.0	<5.0
	06-12-06	–	–	–	–	–	<5.0	<5.0
MW1-20	06-12-02	<0.20	<0.20	<0.20	<0.20	<0.20	–	–
	06-15-04	–	–	–	–	–	<5.0	<5.0
	06-13-06	–	–	–	–	–	<5.0	<5.0
MW1-33	06-15-04	–	–	–	–	–	<5.0	<5.0
	06-12-06	–	–	–	–	–	<5.0	<5.0
Northern plantation								
1MW-1	06-16-04	<20	<20	130	130	730	10	50
	06-12-06	–	–	–	–	–	21	61
MW1-2	06-17-04	<50	12	630	13	110	5.9	1.1
	06-12-06	–	–	–	–	–	5.0	<5.0
MW1-15	06-15-04	<1.0	<1.0	.32	<1.0	.26	<5.0	<5.0
MW1-17	06-17-04	<1.0	<1.0	.68	.23	.48	2.4	<5.0
MW1-18	06-16-04	<1.0	<1.0	<1.0	<1.0	<1.0	19	18
MW1-41	06-17-04	<1.0	<1.0	.27	<1.0	.23	10	<100
	06-12-06	–	–	–	–	–	<100	<100
P1-1	06-09-99	<2	11	6.1	<1	<4	–	–
	06-11-02	<.2	<.20	.16	.11	<.2	–	–
	06-18-03	<1.0	<1.0	.28	<1.0	<1.0	–	–
	06-17-04	<1.0	<1.0	<1.0	<1.0	<1.0	29	8.6
	06-22-05	<1.0	<1.0	.16	<1.0	<1.0	<100	<100
	06-12-06	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<100
P1-3	06-09-99	<16	35	450	20	120	–	–
	06-11-02	<.2	<.20	53	4.3	72	–	–
	06-18-03	<2.0	<2.0	58	4.5	79	–	–
	06-17-04	<1.0	<1.0	15	2.4	41	33	27
	06-22-05	<1.0	<1.0	11	1.3	35	44	30
	06-12-06	<1.0	<1.0	4.6	1.2	16	35	21
P1-4	06-09-99	<130	160	4,800	56	540	–	–
	06-13-01	<20	<20	4,900	46	650	–	–
	06-11-02	<.2	1.2	3,600	41	640	–	–
	06-18-03	<100	<100	3,200	42	440	–	–
	06-17-04	<130	<130	2,300	29	370	7.1	29
	06-21-05	<67	<67	2,100	30	360	7	20
	06-12-06	<50	<50	1,600	24	280	6	19
P1-5	06-08-99	<13	440	400	3.5	11	–	–
	06-10-02	<.20	<.20	.28	.78	.4	–	–
	06-18-03	<25	<25	7.8	<25	<25	–	–
	06-17-04	<10	<10	<10	<10	<10	23	<10
	06-21-05	<10	<10	<10	<10	<10	23	<100
	06-12-06	<10	<10	<10	<10	<10	16	<100

Table 3. Concentrations of selected volatile organic compounds in ground-water samples from monitoring wells and piezometers at Operable Unit 1, Naval Undersea Warfare Center, Division Keyport, Washington, 1999–2006.—Continued

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Study site No.	Date sampled	1,1,1-TCA (µg/L)	1,1-DCA (µg/L)	CA (µg/L)	1,1-DCE (µg/L)	Total BTEX (µg/L)	Total CVOCs (µg/L)
Upgradient							
MW1-3	06-15-04	–	–	–	–	–	–
	06-12-06	–	–	–	–	–	–
MW1-20	06-12-02	<0.20	<0.20	<0.20	<0.20	nd	nd
	06-15-04	–	–	–	–	–	–
	06-12-06	–	–	–	–	–	–
MW1-33	06-15-04	–	–	–	–	–	–
	06-12-06	–	–	–	–	–	–
Northern plantation							
1MW-1	06-16-04	<20	11	<40	<20	nd	1,000
	06-12-06	–	–	–	–	–	–
MW1-2	06-17-04	<50	<50	<100	<50	nd	770
	06-12-06	–	–	–	–	–	–
MW1-15	06-15-04	<1.0	<1.0	.88	<1.0	30	1.5
MW1-17	06-17-04	<1.0	<1.0	<2.0	<1.0	.31	1.4
MW1-18	06-16-04	<1.0	<1.0	<2.0	<1.0	nd	nd
MW1-41	06-17-04	<1.0	<1.0	1.7	<1.0	nd	2.2
	06-12-06	–	–	–	–	–	–
P1-1	06-09-99	<2	.24	<4	<2	19	17
	06-11-02	<.20	.46	<.2	<.20	6.8	.73
	06-18-03	<1.0	.26	<2.0	<1.0	3.9	.54
	06-17-04	<1.0	<1.0	<2.0	<1.0	4.4	nd
	06-22-05	<1.0	<1.0	.19	<1.0	3.5	.35
	06-12-06	<1.0	<1.0	<2.0	<1.0	3.1	nd
P1-3	06-09-99	<16	<16	3.6	<16	nd	630
	06-11-02	<.20	.60	9.9	.20	3.3	140
	06-18-03	<2.0	.56	5.2	<2.0	1.7	150
	06-17-04	<1.0	.38	6.9	<1.0	2.4	66
	06-22-05	<1.0	.31	2.6	<1.0	2.3	50
	06-12-06	<1.0	.32	4.4	<1.0	2.2	26
P1-4	06-09-99	<130	<130	<270	<130	nd	5,600
	06-13-01	<20	<20	<20	<20	nd	5,600
	06-11-02	<.20	<10	.8	9.9	1.1	4,300
	06-18-03	<100	<100	<200	<100	nd	3,700
	06-17-04	<130	<130	<270	<130	nd	2,700
	06-21-05	<67	<67	<130	<67	nd	2,500
	06-12-06	<50	<50	<100	<50	nd	1,900
P1-5	06-08-99	<13	<13	15	<13	47	870
	06-10-02	<.20	.27	20.9	<.20	18	23
	06-18-03	<25	<25	19	<25	nd	27
	06-17-04	<10	<10	23	<10	4.5	23
	06-21-05	<10	<10	21	<10	8.2	21
	06-12-06	<10	<10	14	<10	4.2	14

Table 3. Concentrations of selected volatile organic compounds in ground-water samples from monitoring wells and piezometers at Operable Unit 1, Naval Undersea Warfare Center, Division Keyport, Washington, 1999–2006.—Continued

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Study site No.	Date sampled	PCE (µg/L)	TCE (µg/L)	<i>cis</i> -DCE (µg/L)	<i>trans</i> -DCE (µg/L)	VC (µg/L)	Ethane (µg/L)	Ethene (µg/L)
Southern plantation								
MW1-4	06-18-04	<1,000	32,000	15,000	<1,000	1,600	32	200
	06-13-06	–	–	–	–	–	39	200
MW1-5	06-18-04	<1.0	.26	.29	<1.0	.74	6.7	<50
	06-13-06	–	–	–	–	–	9	30
MW1-6	06-22-04	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<100
MW1-16	06-22-04	<10	<10	2.3	4.2	2.2	38	33
	06-13-06	–	–	–	–	–	23	6.8
P1-6	06-08-99	<400	74	16,000	170	5,400	–	–
	06-14-01	<20	370	16,000	220	9,900	–	–
	06-13-02	<20	<20	3,700	170	5,100	–	–
	06-18-03	<50	470	1,100	39	1,300	–	–
	06-18-04	<20	<20	220	11	570	7.0	210
	06-22-05	<130	<130	4,200	90	2,900	30	590
	06-13-06	<100	<100	300	77	770	82	1,300
P1-7	06-08-99	<670	26,000	35,000	210	3,100	–	–
	06-22-00	3.6	27,000	44,000	220	3,800	–	–
	06-14-01	<20	26,000	37,000	190	4,000	–	–
	06-14-02	<20	37,000	62,000	400	5,700	–	–
	06-20-03	<2,000	28,000	35,000	<2,000	2,800	–	–
	06-18-04	<3,300	37,000	61,000	<3,300	5,100	36	520
	06-22-05	<2,000	28,000	59,000	330	5,000	45	480
	06-13-06	<2,000	24,000	43,000	<2,000	3,800	44	400
P1-8	06-07-99	<710	190	25,000	210	3,400	–	–
	06-14-01	<20	810	8,600	62	4,200	–	–
	06-13-02	<20	<20	24,000	190	7,700	–	–
	06-20-03	<10	230	31	<10	7.2	–	–
	06-18-04	<1.0	.26	2.7	<1.0	23	<50	4.2
	06-23-05	<1.0	<1.0	7	<1.0	21	<50	<50
	06-13-06	<20	<20	620	4.0	58	<50	9.5
P1-9	06-08-99	<2,000	48,000	88,000	470	7,200	–	–
	06-22-00	5.0	88,000	64,000	320	5,800	–	–
	06-14-01	<40	29,000	7,300	32	450	–	–
	06-13-02	<20	90,000	79,000	590	7,900	–	–
	06-20-03	<1,000	60,000	27,000	<1,000	1,800	–	–
	06-18-04	<1,300	50,000	23,000	<1,300	2,100	16	200
	06-23-05	<20	230	700	3.2	97	<5	4
	06-13-06	<5,000	74,000	140,000	850	10,000	66	1,200

Table 3. Concentrations of selected volatile organic compounds in ground-water samples from monitoring wells and piezometers at Operable Unit 1, Naval Undersea Warfare Center, Division Keyport, Washington, 1999–2006.—Continued

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Study site No.	Date sampled	1,1,1-TCA (µg/L)	1,1-DCA (µg/L)	CA (µg/L)	1,1-DCE (µg/L)	Total BTEX (µg/L)	Total CVOCs (µg/L)
Southern plantation							
MW1-4	06-18-04	<1,000	<1,000	<2,000	<1,000	nd	49,000
	06-13-06	–	–	–	–	–	–
MW1-5	06-18-04	<1.0	.36	3	<1.0	0.92	4.6
	06-13-06	–	–	–	–	–	–
MW1-6	06-22-04	<1.0	<1.0	1.7	<1.0	1.9	1.7
MW1-16	06-22-04	<10	590	290	<10	370	900
	06-13-06	–	–	–	–	–	–
P1-6	06-08-99	<400	1,500	300	<400	nd	23,000
	06-14-01	<20	4,800	610	11	88	32,000
	06-13-02	<20	4,300	1,400	<20	63	15,000
	06-18-03	<50	380	270	<50	nd	3,600
	06-18-04	<20	200	88	<20	nd	1,100
	06-22-05	<130	<130	400	<130	nd	7,600
	06-13-06	<100	1,200	2,600	<100	68	4,900
P1-7	06-08-99	<670	<670	<1,300	<670	nd	64,000
	06-22-00	.24	17	8.4	72	18	75,000
	06-14-01	<20	<20	<20	44	nd	68,000
	06-14-02	<20	14	<20	64	nd	105,000
	06-20-03	<2,000	<2,000	<4,000	<2,000	nd	69,000
	06-18-04	<3,300	<3,300	<6,700	<3,300	nd	103,000
	06-22-05	<2,000	<2,000	<4,000	<2,000	nd	92,000
06-13-06	<2,000	<2,000	<4,000	<2,000	nd	71,000	
P1-8	06-07-99	<710	<710	<1,400	<710	nd	29,000
	06-14-01	<20	<20	<20	<20	nd	14,000
	06-13-02	<20	<20	<20	16	nd	32,000
	06-20-03	<10	4.2	<20	<10	nd	270
	06-18-04	<1.0	<1.0	<2.0	<1.0	nd	26
	06-23-05	<1.0	<1.0	<2.0	<1.0	nd	28
	06-13-06	<20	<20	<40	<20	nd	680
P1-9	06-08-99	<2,000	<2,000	<4,000	<2,000	nd	140,000
	06-22-00	<10	2.6	<20	47	36	160,000
	06-14-01	<40	<40	<40	<40	nd	37,000
	06-13-02	<20	<20	<20	54	11	180,000
	06-20-03	<1,000	<1,000	<2,000	<1,000	nd	89,000
	06-18-04	<1,300	<1,300	<2,700	<1,300	nd	75,000
	06-23-05	<20	<20	<40	<20	nd	1,000
	06-13-06	<5,000	<5,000	<10,000	<5,000	nd	220,000

Table 3. Concentrations of selected volatile organic compounds in ground-water samples from monitoring wells and piezometers at Operable Unit 1, Naval Undersea Warfare Center, Division Keyport, Washington, 1999–2006.—Continued

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Study site No.	Date sampled	PCE (µg/L)	TCE (µg/L)	<i>cis</i> -DCE (µg/L)	<i>trans</i> -DCE (µg/L)	VC (µg/L)	Ethane (µg/L)	Ethene (µg/L)
Southern plantation—Continued								
P1-10	06-07-99	<1,000	14,000	34,000	270	2,500	–	–
	06-22-00	1.00	8,700	13,000	100	2,300	–	–
	06-13-01	<20	6,600	12,000	68	1,900	–	–
	06-12-02	<20	4,600	7,000	55	2,000	–	–
	06-19-03	<400	2,300	9,400	<400	1,100	–	–
	06-18-04	<200	1,600	3,900	<200	890	12	46
	06-23-05	<100	1,100	3,000	29	700	3	7
	06-13-06	<1,000	2,200	27,000	160	2,500	19	53
Intermediate aquifer								
1MW-4	06-17-04	<1.0	<1.0	<1.0	<1.0	<1.0	5.3	<50
MW1-25	06-14-02	<20	280	1,800	31	280	–	–
	06-19-03	<67	14	1,800	34	210	–	–
	06-06-04	–	–	–	–	–	4.7	15
	06-21-05	<67	<67	1,700	30	220	6	13
	06-14-06	–	–	–	–	–	7	14
MW1-28	06-14-02	<20	69	1,600	72	700	–	–
	06-19-03	<50	<50	1,200	68	470	–	–
	06-16-04	–	–	–	–	–	3.8	26
	06-21-05	<67	<67	1,550	84	650	4	22
	06-14-06	–	–	–	–	–	<50	18
MW1-38	06-12-02	<.20	<.20	<.20	<.20	<.20	–	–
	06-16-04	–	–	–	–	–	<5.0	<5.0
	06-21-05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<5.0
	06-14-06	–	–	–	–	–	<5	<5.0
MW1-39	06-19-03	<1.0	<1.0	.56	<1.0	1.3	–	–
	06-16-04	–	–	–	–	–	<5.0	<5.0
	06-14-06	–	–	–	–	–	<50	<50

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Study site No.	Date sampled	1,1,1-TCA (µg/L)	1,1-DCA (µg/L)	CA (µg/L)	1,1-DCE (µg/L)	Total BTEX (µg/L)	Total CVOCs (µg/L)
Southern plantation—Continued							
P1-10	06-07-99	<1,000	<1,000	<2,000	<1,000	nd	51,000
	06-22-00	<.1	1.2	.13	16	12	24,000
	06-13-01	<20	<20	<20	11	nd	21,000
	06-12-02	<20	<20	<20	<20	nd	14,000
	06-19-03	<400	<400	<800	<400	nd	13,000
	06-18-04	<200	<200	<400	<200	nd	6,400
	06-23-05	<100	<100	<200	<100	nd	4,800
	06-13-06	<1,000	<1,000	<2,000	<1,000	nd	32,000
Intermediate aquifer							
1MW-4	06-17-04	<1.0	<1.0	<2.0	<1.0	nd	nd
MW1-25	06-14-02	<20	<20	<20	<20	nd	2,400
	06-19-03	<67	<67	<130	<67	nd	2,100
	06-06-04	–	–	–	–	–	–
	06-21-05	<67	<67	<130	<67	nd	2,000
	06-14-06	–	–	–	–	–	–
MW1-28	06-14-02	<20	<20	<20	<20	nd	2,400
	06-19-03	<50	<50	<100	<50	nd	1,700
	06-16-04	–	–	–	–	–	–
	06-21-05	<67	<67	<130	<67	nd	2,300
	06-14-06	–	–	–	–	–	–
MW1-38	06-12-02	<.20	<.20	<.20	<.20	nd	nd
	06-16-04	–	–	–	–	–	–
	06-21-05	<1.0	<1.0	<2.0	<1.0	nd	nd
	06-14-06	–	–	–	–	–	–
MW1-39	06-19-03	<1.0	<1.0	<2.0	<1.0	nd	2.0
	06-16-04	–	–	–	–	–	–