Appendix B

Analytical Accuracy

Appendix B

Analytical Accuracy

Standards (i.e., premixed gas samples at verified concentrations) were purchased at concentrations of 1, 100, 500, and 1,000 ppm. These standard gasses were analyzed before analysis of each set of vapor samples from the vadose zone at the **SDA** to quantify and validate instrument performance. Table B-1 and Figures B-1, B-2, B-3, B-4, and B-5 illustrate the accuracy of the B&K photoacoustic gas analyzer during the mid-year 2003 operational period.

Table B-1. Briiel and Kjær photoacoustic gas analyzer sampling accuracy.

Standard Type	Sample and Analysis Date	$CHCl_3$ (ppm)	1,1,1-TCA (ppm)	PCE (ppm)	TCE (ppm)	CCl_4 (ppm)	H_2O (ppm)	% Error		CCl_4 Standard Gas	
								CCl_4	Standard	Lower 20%	Upper 20%
l-ppm mix	1/9/2003	2.83	3.31	2.62	1.86	1.56	5,070	154%	1.01	0.808	1.212
l-ppm mix	1/16/2003	3.87	5.06	8.54	4.82	2.84	3,250	281%	1.01	0.808	1.212
l-ppm mix	1/23/2003	13.20	23.20	20.20	14.80	11.20	3,130	1,109%	1.01	0.808	1.212
l-ppm mix	1/30/2003	5.28	8.98	9.27	5.88	4.14	2,960	410%	1.01	0.808	1.212
l-ppm mix	2/5/2003	2.50	4.42	6.94	3.60	2.00	2,430	198%	1.01	0.808	1.212
l-ppm mix	2/6/2003	1.44	2.72	3.11	1.77	1.40	1,410	139%	1.01	0.808	1.212
l-ppm mix	2/13/2003	1.30	2.33	2.95	1.77	1.24	2,020	123%	1.01	0.808	1.212
l-ppm mix	2/20/2003	1.73	3.12	2.17	1.72	1.56	2,050	154%	1.01	0.808	1.212
l-ppm mix	2/27/2003	2.14	3.36	1.10	1.11	0.99	4,200	98%	1.01	0.808	1.212
l-ppm mix	3/5/2003	1.10	2.50	1.32	1.24	1.21	1,880	120%	1.01	0.808	1.212
l-ppm mix	3/6/2003	1.17	2.46	1.21	1.20	1.22	1,770	121%	1.01	0.808	1.212
l-ppm mix	3/11/2003	2.10	2.98	1.30	1.07	1.03	2,980	102%	1.01	0.808	1.212
l-ppm mix	3/13/2003	1.57	2.70	1.26	1.14	1.04	2,930	103%	1.01	0.808	1.212
l-ppm mix	3/20/2003	1.00	2.45	1.23	1.17	1.20	2,300	119%	1.01	0.808	1.212
l-ppm mix	3/27/2003	0.97	2.37	1.22	1.12	1.21	1,920	120%	1.01	0.808	1.212
l-ppm mix	4/1/2003	1.72	2.47	1.25	1.13	1.05	4,550	104%	1.01	0.808	1.212
l-ppm mix	4/2/2003	1.19	2.22	1.23	1.10	1.02	2,890	101%	1.01	0.808	1.212
l-ppm mix	4/3/2003	1.47	2.34	1.24	1.13	1.08	3,040	107%	1.01	0.808	1.212
l-ppm mix	4/10/2003	1.35	2.40	1.27	1.14	1.07	2,480	106%	1.01	0.808	1.212
l-ppm mix	4/17/2003	1.67	2.38	1.30	1.15	1.08	4,670	107%	1.01	0.808	1.212
l-ppm mix	4/24/2003	1.76	3.80	1.19	1.29	1.09	8,860	108%	1.01	0.808	1.212
l-ppm mix	5/1/2003	1.11	2.48	1.19	1.14	1.09	3,680	108%	1.01	0.808	1.212
l-ppm mix	5/5/2003	0.99	2.37	1.16	1.16	1.05	2,400	104%	1.01	0.808	1.212
l-ppm mix	5/6/2003	0.94	2.10	1.10	1.03	0.95	2,430	94%	1.01	0.808	1.212
l-ppm mix	5/8/2003	1.22	2.14	1.08	1.11	0.94	1,990	93%	1.01	0.808	1.212
l-ppm mix	5/15/2003	1.16	2.19	1.16	1.09	1.07	3,020	106%	1.01	0.808	1.212
l-ppm mix	5/22/2003	1.07	2.06	1.06	1.17	1.03	2,890	102%	1.01	0.808	1.212
l-ppm mix	5/29/2003	1.22	2.27	1.07	1.10	1.02	3,560	101%	1.01	0.808	1.212
l-ppm mix	6/2/2003	1.27	2.28	1.14	1.07	1.04	3,840	103%	1.01	0.808	1.212
l-ppm mix	6/3/2003	1.39	2.16	1.06	1.02	0.86	3,820	85%	1.01	0.808	1.212
l-ppm mix	6/5/2003	1.40	2.17	1.04	1.10	0.93	3,190	92%	1.01	0.808	1.212

Table B-1. (continued)

Standard Type	Sample and Analysis Date	$CHCl_3$ (ppm)	1,1,1-TCA (ppm)	PCE (ppm)	TCE (ppm)	CCl_4 (ppm)	H_2O (ppm)	% Error		CCl_4 Standard Gas	
								CCl_4	Standard	Lower 20%	Upper 20%
1-ppm mix	6/12/2003	1.17	2.29	1.52	1.28	1.39	2.940	138%	1.01	0.808	1.212
100-ppm mix	1/8/2003	110	203	114	108	92.8	1,530	92%	100.5	80.4	120.6
100-ppm mix	1/9/2003	109	205	112	111	96.1	5,010	96%	100.5	80.4	120.6
100-ppm mix	1/16/2003	103	192	108	102	87.1	2,350	87%	100.5	80.4	120.6
100-ppm mix	1/23/2003	107	200	112	107	92.0	2,850	92%	100.5	80.4	120.6
100-ppm mix	1/30/2003	117	216	123	115	98.4	3,040	98%	100.5	80.4	120.6
100-ppm mix	2/5/2003	134	249	142	131	115.0	1,990	114%	100.5	80.4	120.6
100-ppm mix	2/6/2003	111	207	116	108	97.1	1,420	97%	100.5	80.4	120.6
100-ppm mix	2/13/2003	127	235	135	127	110.0	1,570	109%	100.5	80.4	120.6
100-ppm mix	2/20/2003	107	201	111	104	91.4	2,310	91%	100.5	80.4	120.6
100-ppm mix	2/27/2003	107	199	108	107	92.8	4,400	92%	100.5	80.4	120.6
100-ppm mix	3/5/2003	108	200	113	107	91.2	1,500	91%	100.5	80.4	120.6
100-ppm mix	3/6/2003	108	200	112	106	91.2	2,010	91%	100.5	80.4	120.6
100-ppm mix	3/11/2003	109	202	113	108	93.0	2,890	93%	100.5	80.4	120.6
100-ppm mix	3/13/2003	109	202	113	106	92.5	2,930	92%	100.5	80.4	120.6
100-ppm mix	3/20/2003	108	201	113	108	92.4	1,880	92%	100.5	80.4	120.6
100-ppm mix	3/27/2003	109	202	112	108	92.6	1,760	92%	100.5	80.4	120.6
100-ppm mix	4/1/2003	107	198	111	105	90.3	5,180	92%	98.55	78.84	118.26
100-ppm mix	4/2/2003	107	199	113	105	89.8	3,030	91%	98.55	78.84	118.26
100-ppm mix	4/3/2003	114	198	112	105	89.5	2,540	91%	98.55	78.84	118.26
100-ppm mix	4/10/2003	115	199	122	107	90.7	2,510	92%	98.55	78.84	118.26
100-ppm mix	4/17/2003	111	195	114	102	88.6	6,150	90%	98.55	78.84	118.26
100-ppm mix	4/24/2003	105	183	96.1	95.1	83.6	1,0600	85%	98.55	78.84	118.26
100-ppm mix	5/1/2003	108	186	99.9	98.0	84.7	4,360	86%	98.55	78.84	118.26
100-ppm mix	5/5/2003	107	185	100.0	96.9	83.7	3,330	85%	98.55	78.84	118.26
100-ppm mix	5/6/2003	1,060	182	97.6	95.5	82.4	3,130	84%	98.55	78.84	118.26
100-ppm mix	5/8/2003	109	188	101.0	98.7	85.0	2,130	86%	98.55	78.84	118.26
100-ppm mix	5/15/2003	106	182	97.9	95.6	82.6	4,230	84%	98.55	78.84	118.26
100-ppm mix	5/22/2003	114	196	106.0	103.0	89.2	2,510	91%	98.55	78.84	118.26
100-ppm mix	5/29/2003	106	183	98.5	96.4	83.2	4,970	84%	98.55	78.84	118.26
100-ppm mix	6/2/2003	107	184	99.1	96.8	83.5	4,750	85%	98.55	78.84	118.26

Table B-1. (continued)

Standard Type	Sample and Analysis Date	$CHCl_3$ (ppm)	1,1,1-TCA (ppm)	PCE (ppm)	TCE (ppm)	CCl_4 (ppm)	H_2O (ppm)	% Error		CCl_4 Standard Gas	
								CCl_4	Standard	Lower 20%	Upper 20%
100-ppm mix	6/3/2003	107	184	96.1	96.0	83.8	4,840	85%	98.55	78.84	118.26
100-ppm mix	6/5/2003	109	188	100.0	98.2	85.1	4,410	86%	98.55	78.84	118.26
100-ppm mix	6/12/2003	109	190	101.0	101.0	88.6	5,260	90%	98.55	78.84	118.26
500-ppm mix	1/8/2003	518	950	498	493	442	2,200	89%	498.87	399.096	598.644
500-ppm mix	1/9/2003	495	921	473	486	463	5,280	93%	498.87	399.096	598.644
500-ppm mix	1/16/2003	509	955	491	480	447	3,280	90%	498.87	399.096	598.644
500-ppm mix	1/23/2003	521	965	516	501	453	5,040	91%	498.87	399.096	598.644
500-ppm mix	1/30/2003	518	950	513	494	440	5,230	88%	498.87	399.096	598.644
500-ppm mix	2/5/2003	488	895	489	465	490	2,500	98%	498.87	399.096	598.644
500-ppm mix	2/6/2003	514	939	518	491	436	1,530	87%	498.87	399.096	598.644
500-ppm mix	2/13/2003	486	893	487	473	485	2,120	97%	498.87	399.096	598.644
500-ppm mix	2/20/2003	494	907	496	473	427	3,080	86%	498.87	399.096	598.644
500-ppm mix	2/27/2003	512	960	502	501	460	4,680	92%	498.87	399.096	598.644
500-ppm mix	3/5/2003	518	954	514	495	446	2,500	89%	498.87	399.096	598.644
500-ppm mix	3/6/2003	528	968	535	511	452	2,350	91%	498.87	399.096	598.644
500-ppm mix	3/11/2003	525	971	516	508	457	4,140	92%	498.87	399.096	598.644
500-ppm mix	3/13/2003	530	976	522	508	456	3,210	91%	498.87	399.096	598.644
500-ppm mix	3/20/2003	541	989	558	529	464	2,230	93%	498.87	399.096	598.644
500-ppm mix	3/27/2003	543	1,020	634	546	479	2,650	96%	498.87	399.096	598.644
500-ppm mix	4/1/2003	530	980	603	519	457	5,670	92%	498.87	399.096	598.644
500-ppm mix	4/2/2003	528	967	567	510	448	3,500	90%	498.87	399.096	598.644
500-ppm mix	4/3/2003	527	965	544	500	446	4,130	89%	498.87	399.096	598.644
500-ppm mix	4/10/2003	536	987	578	517	459	3,900	92%	498.87	399.096	598.644
500-ppm mix	4/17/2003	515	957	522	489	444	6,270	89%	498.87	399.096	598.644
500-ppm mix	4/24/2003	516	952	487	489	444	10,500	89%	498.87	399.096	598.644
500-ppm mix	5/1/2003	512	935	475	479	432	3,660	87%	498.87	399.096	598.644
500-ppm mix	5/5/2003	508	927	474	476	428	3,030	86%	498.87	399.096	598.644
500-ppm mix	5/6/2003	500	914	468	469	422	3,750	85%	498.87	399.096	598.644
500-ppm mix	5/8/2003	504	921	492	478	426	3,470	85%	498.87	399.096	598.644
500-ppm mix	5/15/2003	506	926	485	480	430	4,280	86%	498.87	399.096	598.644
500-ppm mix	5/22/2003	508	929	482	479	429	3,330	86%	498.87	399.096	598.644

Table B-1. (continued)

Standard Type	Sample and Analysis Date	$CHCl_3$ (ppm)	1,1,1-TCA (ppm)	PCE (ppm)	TCE (ppm)	CCl_4 (ppm)	H_2O (ppm)	% Error		CCl_4 Standard Gas	
								CCl_4	Standard	Lower 20%	Upper 20%
500-ppm mix	5/29/2003	507	929	496	485	432	5.340	87%	498.87	399.096	598.644
1,000-ppm CCl_4	1/8/2003	19.40	29.90	41.10	3.09	975	1,610	98%	998.7	798.96	1,198.44
1,000-ppm CCl_4	1/9/2003	7.43	9.46	19.40	0.00	1,030	5,670	103%	998.7	798.96	1,198.44
1,000-ppm CCl_4	1/16/2003	16.70	26.00	31.20	1.55	925	2,930	93%	998.7	798.96	1,198.44
1,000-ppm CCl_4	1/23/2003	7.46	8.54	24.40	0.00	988	3,510	99%	998.7	798.96	1,198.44
1,000-ppm CCl_4	1/30/2003	7.48	7.94	23.00	0.00	973	4,470	97%	998.7	798.96	1,198.44
1,000-ppm CCl_4	2/5/2003	7.18	7.27	21.90	-11.00	972	2,510	97%	998.7	798.96	1,198.44
1,000-ppm CCl_4	2/6/2003	49.70	86.50	72.50	33.30	961	1,580	96%	998.7	798.96	1,198.44
1,000-ppm CCl_4	2/13/2003	7.73	9.68	21.90	0.00	984	2,040	99%	998.7	798.96	1,198.44
1,000-ppm CCl_4	2/20/2003	6.89	7.19	21.40	0.00	959	2,830	96%	998.7	798.96	1,198.44
1,000-ppm CCl_4	2/27/2003	5.72	6.77	18.00	0.00	1,020	4,200	102%	998.7	798.96	1,198.44
1,000-ppm CCl_4	3/5/2003	6.43	6.82	19.90	-11.00	991	1,980	99%	998.7	798.96	1,198.44
1,000-ppm CC14	3/6/2003	7.04	7.68	22.60	0.00	998	2,250	100%	998.7	798.96	1,198.44
1,000-ppm CC14	3/11/2003	6.87	7.46	20.30	-10.00	1,010	3,940	101%	998.7	798.96	1,198.44
1,000-ppm CC14	3/13/2003	6.92	7.51	21.10	0.00	1,020	2,830	102%	998.7	798.96	1,198.44
1,000-ppm CCl_4	3/20/2003	6.15	7.13	21	0.00	1,010	1,950	101%	998.7	798.96	1,198.44
1,000-ppm CCl_4	3/27/2003	6.11	7.06	23.2	0.00	1,010	2,120	101%	998.7	798.96	1,198.44
1,000-ppm CCl_4	4/1/2003	6.68	7.49	23.5	-8.6	949	5,820	95%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	4/2/2003	7.19	7.54	23.8	-10	978	3,950	98%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	4/3/2003	7.54	7.88	23.4	0	979	4,600	98%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	4/10/2003	7.11	7.59	23.6	0	991	3,620	99%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	4/17/2003	6.76	6.95	20	0	971	6,300	97%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	4/24/2003	3.97	4.50	10.7	0	971	7,800	97%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	5/1/2003	8.71	11.70	26.5	0	918	4,310	92%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	5/5/2003	7.27	9.20	22.7	-8.3	951	2,920	95%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	5/6/2003	6.96	8.99	22.7	-8.2	953	2,760	95%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	5/8/2003	8.68	11.50	28.1	0	946	2,570	94%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	5/15/2003	8.85	11.40	27.1	0	957	3,990	96%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	5/22/2003	8.58	10.90	26.2	-5.4	947	3,670	95%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	5/29/2003	8.64	11.10	27.00	-4.8	945	4,890	94%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	6/2/2003	4.03	1.80	6.60	-17	939	4,060	94%	1,001.2	800.96	1,201.44

Table B-1. (continued).

Standard Type	Sample and Analysis Date	$CHCl_3$ (pprn)	1,1,1-TCA (pprn)	PCE (pprn)	TCE (pprn)	CCl_4 (ppm)	H_2O (ppm)	% Error		CCl_4 Standard Gas	
								CCl_4	Standard	Lower 20%	Upper 20%
1,000-ppm CCl_4	6/3/2003	4.32	2.09	7.20	0.00	973	4,490	97%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	6/5/2003	4.44	2.19	7.42	0.00	927	4,270	93%	1,001.2	800.96	1,201.44
1,000-ppm CCl_4	6/12/2003	3.4	2.12	6.98	-15.00	950	6,710	95%	1,001.2	800.96	1,201.44

1,1,1-TCA = 1,1,1-trichloroethane
CCl_4 = carbon tetrachloride
$CHCl_3$ = chloroform
PCE = tetrachloroethene
TCE = trichloroethene

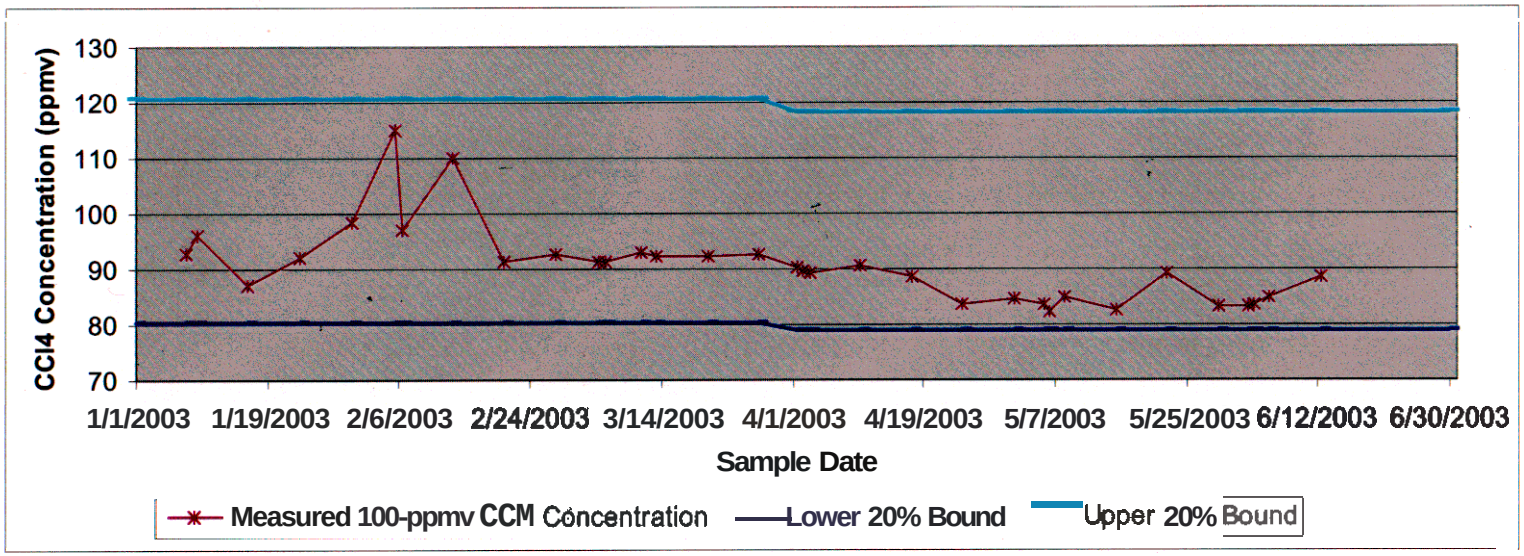

Figure B-3. Briiel and Kjsx photoacoustic gas analyzer 100-ppmv carbon tetrachloride standard.

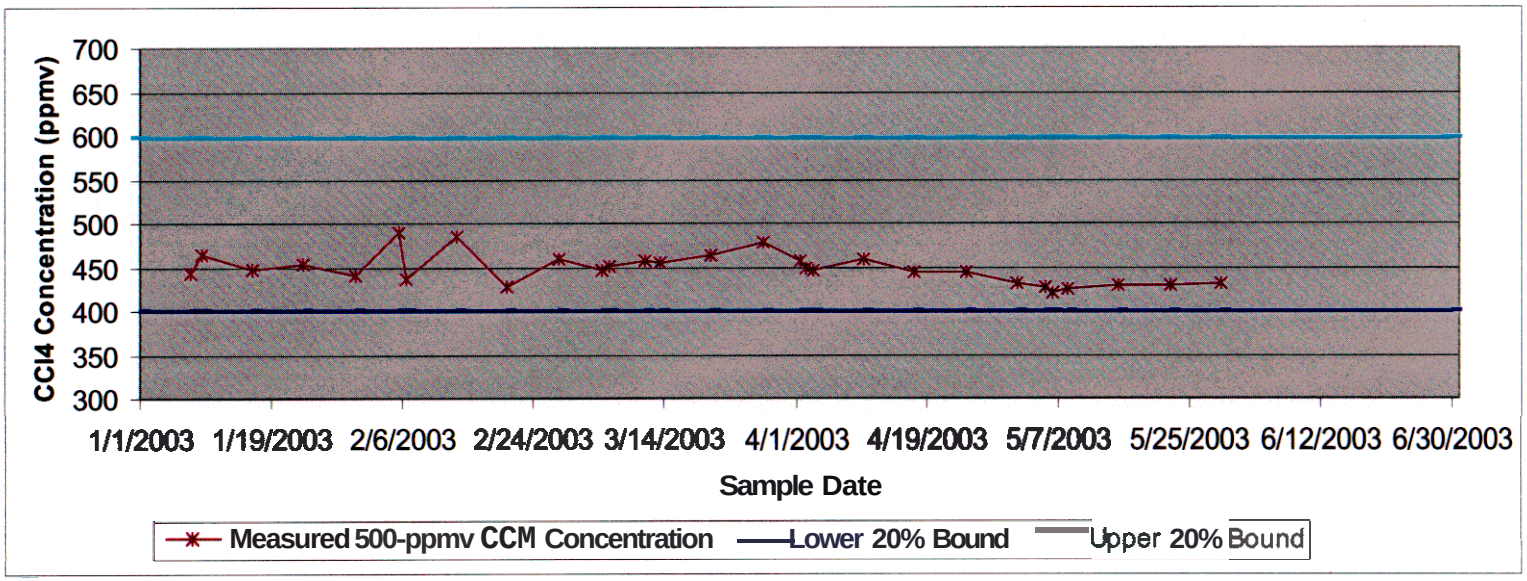

Figure B-4. Briiel and Kjær photoacoustic gas analyzer 500-ppmv carbon tetrachloride standard.

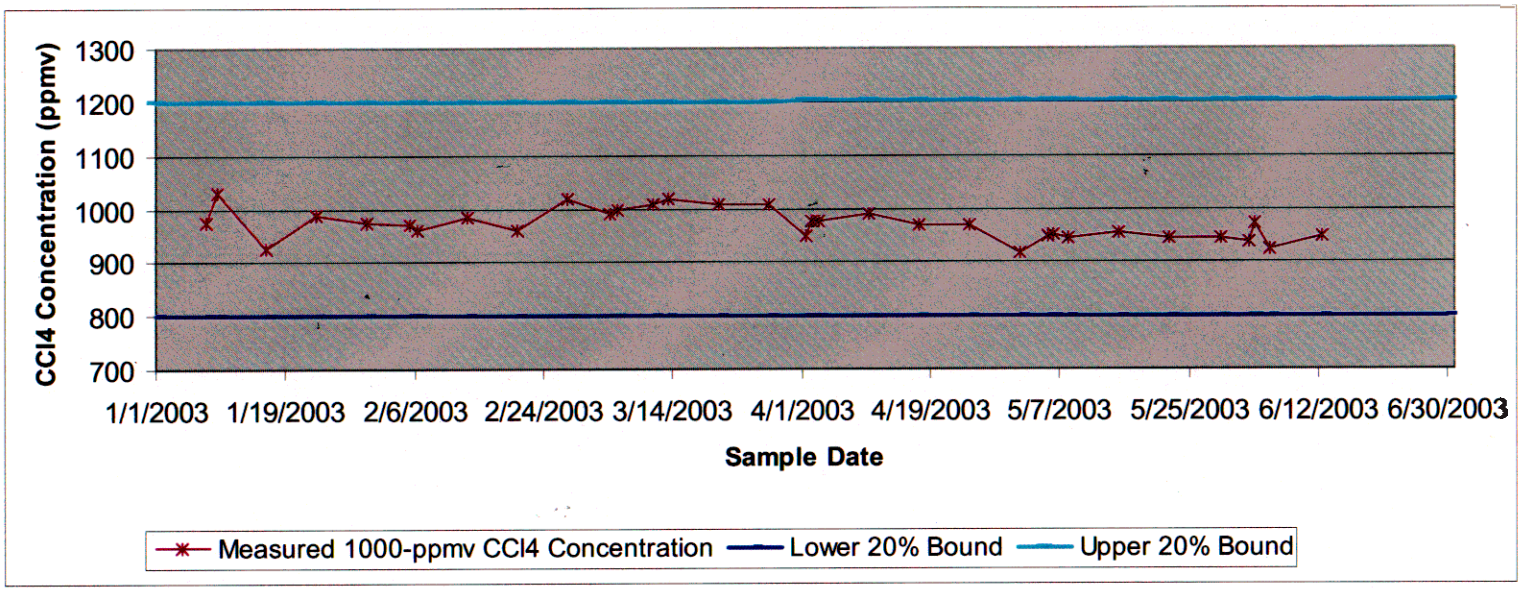

Figure B-5. Brüel and Kjær photoacoustic gas analyzer 1,000-ppmv carbon tetrachloride standard.

Appendix C

Mass Removal Sample Data

Appendix C

Mass Removal Sample Data

Appendix C comprises four tables and five figures. Tables C-1 though C-4 contain the VOC mass removal from each of the three vapor vacuum extraction units at the SDA and a cumulative breakdown, per operating cycle, for mass removal through the mid-year 2003 operational period. Figures C-1 through C-3 illustrate the carbon tetrachloride sample concentrations at the units during the mid-year 2003 operational period. Figures C-4 and C-5 illustrate the proportion of each VOC of the cumulative mass removed during the mid-year 2003 operational period.

Table C-1. Unit **A** mid-year 2003 mass removal calculations

				Actual Data						Riemann Sums				
ID Number	Sample Date	Sample Time	Decimal Date	$CHCl_3$ (ppmv)	1,1,1-TCA (ppmv)	PCE (ppmv)	TCE (ppmv)	CCl_4 (ppmv)	Number of Days	$CHCl_3$ (ppmv/ day)	1,1,1-TCA (ppmv/ day)	PCE (ppmv/ day)	TCE (ppmv/ day)	CCl_4 (ppmv/ day)
Start	1/1/2003	0:00	36160.0	3.37E+01	7.96E+00	2.36E+00	2.24E+01	6.75E+01	0.00	22.47	5.31	1.57	14.93	45.00
Unit A-1/2/03	1/2/2003	8:00	36161.3	3.37E+01	7.96E+00	2.36E+00	2.24E+01	6.75E+01	1.33	38.09	9.00	2.67	25.32	76.29
stop	1/3/2003	6:15	36162.3	3.37E+01	7.96E+00	2.36E+00	2.24E+01	6.75E+01	2.26	15.62	3.69	1.09	10.38	31.29
Start	1/3/2003	19:16	36162.8	6.32E+01	1.68E+01	4.71E+00	4.69E+01	1.60E+02	0.00	77.99	20.73	5.81	57.88	197.44
Unit A-1/6/03	1/6/2003	6:30	36165.3	6.32E+01	1.68E+01	4.71E+00	4.69E+01	1.60E+02	2.47	115.58	30.72	8.61	85.77	292.61
Unit A-1/7/03	1/7/2003	11:03	36166.5	5.86E+01	2.03E+01	4.70E+00	4.64E+01	2.16E+02	3.66	59.21	20.51	4.75	46.88	218.25
Unit A-1/8/03	1/8/2003	7:00	36167.3	7.17E+01	2.32E+01	5.20E+00	6.97E+01	2.52E+02	4.49	67.14	21.73	4.87	65.27	235.99
Unit A-1/9/03	1/9/2003	8:00	36168.3	6.91E+01	1.88E+01	4.58E+00	6.46E+01	1.94E+02	5.53	178.15	48.47	11.81	166.55	500.16
Unit A-1/13/03	1/13/2003	10:45	36172.4	5.38E+01	1.51E+01	5.47E+00	4.06E+01	1.49E+02	9.65	136.37	38.27	13.86	102.91	377.67
Unit A-1/14/03	1/14/2003	9:40	36173.4	6.31E+01	2.01E+01	5.76E+00	5.27E+01	2.15E+02	10.60	60.80	19.37	5.55	50.78	207.16
Unit A-1/15/03	1/15/2003	9:00	36174.4	5.78E+01	1.36E+01	4.35E+00	4.73E+01	1.31E+02	11.57	55.79	13.13	4.20	45.66	126.45
Unit A-1/16/03	1/16/2003	8:00	36175.3	4.66E+01	1.15E+01	3.73E+00	3.59E+01	1.07E+02	12.53	116.14	28.66	9.30	89.48	266.68
Unit A-1/20/03	1/20/2003	8:38	36179.4	6.60E+01	1.83E+01	7.05E+00	5.89E+01	1.79E+02	16.56	166.37	46.13	17.77	148.48	451.23
Unit A-1/21/03	1/21/2003	9:00	36180.4	6.08E+01	1.57E+01	5.63E+00	5.13E+01	1.52E+02	17.57	60.67	15.67	5.62	51.19	151.68
Unit A-1/22/03	1/22/2003	8:32	36181.4	5.65E+01	1.44E+01	4.88E+00	4.65E+01	1.39E+02	18.55	55.32	14.10	4.78	45.53	136.10
Unit A-1/23/03	1/23/2003	8:00	36182.3	5.64E+01	1.67E+01	5.02E+00	4.67E+01	1.72E+02	19.53	140.63	41.64	12.52	116.44	428.87
Unit A-1/27/03	1/27/2003	8:13	36186.3	6.62E+01	2.04E+01	7.34E+00	6.39E+01	2.15E+02	23.54	176.03	54.24	19.52	169.91	571.69
stop	1/28/2003	15:38	36187.7	6.25E+01	1.50E+01	5.53E+00	5.28E+01	1.48E+02	24.85	40.91	9.82	3.62	34.56	96.87
Start	1/29/2003	15:59	36188.7	6.93E+01	1.71E+01	5.07E+00	5.65E+01	1.77E+02	0.00	23.12	5.71	1.69	18.85	59.06
Unit A-1/30/03	1/30/2003	8:00	36189.3	7.01E+01	2.07E+01	5.65E+00	6.55E+01	2.25E+02	0.67	165.29	48.81	13.32	154.45	530.55
Unit A-2/3/03	2/3/2003	9:10	36193.4	4.32E+01	1.02E+01	5.50E+00	3.28E+01	9.45E+01	4.72	108.37	25.59	13.80	82.28	237.07
Unit A-2/4/03	2/4/2003	8:25	36194.4	4.89E+01	1.41E+01	5.04E+00	3.97E+01	1.45E+02	5.68	51.58	14.87	5.32	41.88	152.95
Unit A-2/5/03	2/5/2003	11:48	36195.5	5.21E+01	1.57E+01	4.77E+00	4.24E+01	1.69E+02	6.83	51.23	15.44	4.69	41.69	166.18
stop	2/6/2003	7:37	36196.3	5.21E+01	1.57E+01	4.77E+00	4.24E+01	1.69E+02	7.65	21.51	6.48	1.97	17.50	69.77
Start	2/6/2003	13:48	36196.6	5.21E+01	1.57E+01	4.77E+00	4.24E+01	1.69E+02	0.00	98.56	29.70	9.02	80.21	319.69
Unit A-2/10/03	2/10/2003	8:36	36200.4	5.94E+01	1.59E+01	4.98E+00	5.08E+01	1.68E+02	3.78	142.97	38.27	11.99	122.27	404.37
Unit A-2/11/03	2/11/2003	9:20	36201.4	5.56E+01	1.40E+01	3.83E+00	4.23E+01	1.42E+02	4.81	55.97	14.09	3.86	42.58	142.94

Table C-1. (continued)

				Actual Data						Riemann Sums				
ID Number	Sample Date	Sample Time	Decimal Date	$CHCl_3$ (ppmv)	1,1,1-TCA (ppmv)	PCE (ppmv)	TCE (ppmv)	CCl_4 (ppmv)	Number of Days	$CHCl_3$ (ppmv/ day)	1,1,1-TCA (ppmv/ day)	PCE (ppmv/ day)	TCE (ppmv/ day)	CCl_4 (ppmv/ day)
Unit A-2/12/03	2/12/2003	8:55	36202.4	5.46E+01	1.45E+01	3.59E+00	4.15E+01	1.49E+02	5.80	53.08	14.10	3.49	40.35	144.86
Unit A-2/13/03	2/13/2003	8:00	36203.3	7.49E+01	2.21E+01	5.65E+00	7.73E+01	2.35E+02	6.76	187.38	55.29	14.13	193.38	587.91
Unit A-2/17/03	2/17/2003	9:00	36207.4	5.37E+01	1.37E+01	5.51E+00	4.09E+01	1.29E+02	10.80	134.31	34.26	13.78	102.29	322.63
Unit A-2/18/03	2/18/2003	8:03	36208.3	6.10E+01	1.67E+01	5.42E+00	5.11E+01	1.69E+02	11.76	61.00	16.70	5.42	51.10	169.00
Unit A-2/19/03	2/19/2003	9:00	36209.4	6.15E+01	1.60E+01	4.84E+00	5.11E+01	1.63E+02	12.80	61.44	15.98	4.83	51.05	162.83
Unit A-2/20/03	2/20/2003	8:00	36210.3	6.82E+01	1.80E+01	5.53E+00	6.07E+01	1.82E+02	13.76	181.39	47.88	14.71	161.45	484.07
Unit A-2/24/03	2/24/2003	16:40	36214.7	5.11E+01	1.57E+01	4.97E+00	4.19E+01	1.67E+02	18.12	128.23	39.40	12.47	105.14	419.07
Unit A-2/25/03	2/25/2003	8:27	36215.4	5.54E+01	1.61E+01	4.45E+00	4.62E+01	1.66E+02	18.78	46.55	13.53	3.74	38.82	139.49
Unit A-2/26/03	2/26/2003	9:00	36216.4	5.99E+01	1.66E+01	4.34E+00	5.47E+01	1.68E+02	19.80	59.34	16.44	4.30	54.19	166.43
Unit A-2/27/03	2/27/2003	8:00	36217.3	5.97E+01	1.49E+01	4.03E+00	5.12E+01	1.46E+02	20.76	68.45	17.08	4.62	58.70	167.39
stop	2/28/2003	16:02	36218.7	5.97E+01	1.49E+01	4.03E+00	5.12E+01	1.46E+02	22.09	39.84	9.94	2.69	34.17	97.43
Start	3/3/2003	12:39	36221.5	6.86E+01	2.36E+01	7.66E+00	6.37E+01	2.54E+02	0.00	28.61	9.84	3.19	26.56	105.92
Unit A-3/4/03	3/4/2003	8:40	36222.4	7.37E+01	1.96E+01	6.30E+00	6.46E+01	1.99E+02	0.83	67.46	17.94	5.77	59.13	182.14
Unit A-3/5/03	3/5/2003	8:35	36223.4	6.35E+01	1.55E+01	5.08E+00	5.22E+01	1.53E+02	1.83	62.62	15.28	5.01	51.48	150.88
Unit A-3/6/03	3/6/2003	8:00	36224.3	5.82E+01	1.43E+01	4.57E+00	4.81E+01	1.40E+02	2.81	145.70	35.80	11.44	120.42	350.49
Unit A-3/10/03	3/10/2003	8:45	36228.4	4.96E+01	1.44E+01	5.38E+00	3.72E+01	1.44E+02	6.84	125.46	36.42	13.61	94.10	364.25
Unit A-3/11/03	3/11/2003	9:25	36229.4	6.06E+01	1.93E+01	5.63E+00	5.41E+01	2.00E+02	7.87	60.07	19.13	5.58	53.63	198.26
Unit A-3/12/03	3/12/2003	8:20	36230.3	6.36E+01	1.61E+01	4.86E+00	5.45E+01	1.60E+02	8.82	61.72	15.62	4.72	52.89	155.28
Unit A-3/13/03	3/13/2003	8:00	36231.3	5.95E+01	1.57E+01	4.32E+00	4.79E+01	1.60E+02	9.81	148.79	39.26	10.80	119.78	400.11
Unit A-3/17/03	3/17/2003	8:22	36235.3	5.41E+01	1.37E+01	5.49E+00	4.38E+01	1.33E+02	13.82	135.63	34.35	13.76	109.80	333.42
Unit A-3/18/03	3/18/2003	8:20	36236.3	5.07E+01	1.19E+01	4.27E+00	3.92E+01	1.13E+02	14.82	51.02	11.97	4.30	39.44	113.71
Unit A-3/19/03	3/19/2003	8:40	36237.4	4.60E+01	1.16E+01	3.66E+00	3.44E+01	1.11E+02	15.83	45.68	11.52	3.63	34.16	110.23
Unit A-3/20/03	3/20/2003	8:00	36238.3	5.79E+01	1.80E+01	4.79E+00	4.97E+01	1.93E+02	16.81	154.30	47.97	12.77	132.45	514.33
Unit A-3/24/03	3/24/2003	16:35	36242.7	5.56E+01	1.48E+01	5.71E+00	4.30E+01	1.47E+02	21.16	138.81	36.95	14.26	107.35	366.99
Unit A-3/25/03	3/25/2003	7:50	36243.3	4.96E+01	1.22E+01	4.14E+00	3.63E+01	1.16E+02	21.80	41.59	10.23	3.47	30.44	97.27
Unit A-3/26/03	3/26/2003	8:50	36244.4	5.77E+01	1.73E+01	4.97E+00	5.36E+01	1.81E+02	22.84	57.90	17.36	4.99	53.79	181.63
Unit A-3/27/03	3/27/2003	8:00	36245.3	5.77E+01	1.73E+01	4.97E+00	5.36E+01	1.81E+02	23.81	144.05	43.19	12.41	133.81	451.87
Unit A-3/31/03	3/31/2003	8:40	36249.4	6.47E+01	1.97E+01	7.32E+00	5.96E+01	1.98E+02	27.83	162.20	49.39	18.35	149.41	496.37
Unit A-4/1/03	4/1/2003	8:20	36250.3	6.40E+01	1.45E+01	5.68E+00	5.26E+01	1.36E+02	28.82	63.78	14.45	5.66	52.42	135.53
Unit A-4/2/03	4/2/2003	8:30	36251.4	5.91E+01	1.39E+01	5.02E+00	4.95E+01	1.32E+02	29.83	58.69	13.80	4.99	49.16	131.08

Table C-1. (continued)

ID Number	Sample Date	Sample Time	Decimal Date	Actual Data $CHCl_3$ (ppmv)	1,1,1-TCA (ppmv)	PCE (ppmv)	TCE (ppmv)	CCl_4 (ppmv)	Number of Days	Riemann Sums $CHCl_3$ (ppmv/day)	1,1,1-TCA (ppmv/day)	PCE (ppmv/day)	TCE (ppmv/day)	CCl_4 (ppmv/day)
Unit A-4/3/03	4/3/2003	8:00	36252.3	4.55E+01	1.04E+01	3.94E+00	3.69E+01	9.55E+01	30.81	113.75	26.00	9.85	92.25	238.75
Unit A-4/7/03	4/7/2003	8:30	36256.4	4.48E+01	1.04E+01	5.23E+00	3.23E+01	9.18E+01	34.83	112.61	26.14	13.15	81.19	230.74
stop	4/8/2003	8:39	36257.4	4.48E+01	1.24E+01	4.70E+00	3.26E+01	1.16E+02	35.83	22.54	6.24	2.36	16.40	58.36
Unit A-4/9/03	4/9/2003	11:07	36258.5	5.21E+01	2.00E+01	5.49E+00	4.21E+01	2.20E+02	0.00	22.67	8.70	2.39	18.32	95.72
Unit A-4/10/03	4/10/2003	8:00	36259.3	7.24E+01	2.00E+01	5.80E+00	6.19E+01	2.03E+02	0.87	189.37	52.31	15.17	161.91	530.97
Unit A-4/14/03	4/14/2003	16:40	36263.7	5.29E+01	1.43E+01	6.06E+00	3.95E+01	1.38E+02	5.23	132.16	35.73	15.14	98.68	344.76
Unit A-4/15/03	4/15/2003	7:55	36264.3	5.56E+01	1.57E+01	5.49E+00	4.52E+01	1.53E+02	5.87	45.18	12.76	4.46	36.73	124.31
Unit A-4/16/03	4/16/2003	7:40	36265.3	4.98E+01	1.14E+01	4.20E+00	3.61E+01	1.02E+02	6.86	49.89	11.42	4.21	36.16	102.18
Unit A-4/17/03	4/17/2003	8:00	36266.3	6.19E+01	1.97E+01	5.66E+00	5.32E+01	2.05E+02	7.87	155.39	49.46	14.21	133.55	514.64
Unit A-4/21/03	4/21/2003	8:10	36270.3	6.37E+01	2.22E+01	4.82E+00	5.38E+01	2.00E+02	11.88	159.47	55.58	12.07	134.69	500.69
Unit A-4/22/03	4/22/2003	8:10	36271.3	5.86E+01	1.71E+01	3.78E+00	4.78E+01	1.42E+02	12.88	58.70	17.13	3.79	47.88	142.25
Unit A-4/23/03	4/23/2003	8:15	36272.3	5.34E+01	1.51E+01	3.50E+00	4.33E+01	1.22E+02	13.88	53.21	15.05	3.49	43.15	121.58
Unit A-4/24/03	4/24/2003	8:00	36273.3	4.41E+01	1.31E+01	3.02E+00	3.42E+01	1.02E+02	14.87	110.17	32.73	7.54	85.44	254.82
Unit A-4/28/03	4/28/2003	8:10	36277.3	5.91E+01	2.07E+01	8.07E+00	4.83E+01	1.96E+02	18.88	148.06	51.86	20.22	121.00	491.02
Unit A-4/29/03	4/29/2003	8:15	36278.3	5.56E+01	1.62E+01	5.89E+00	4.51E+01	1.46E+02	19.88	55.79	16.26	5.91	45.26	146.51
Unit A-4/30/03	4/30/2003	8:20	36279.3	5.37E+01	1.49E+01	4.94E+00	4.19E+01	1.32E+02	20.88	53.42	14.82	4.91	41.68	131.31
Unit A-5/1/03	5/1/2003	8:00	36280.3	4.67E+01	1.28E+01	3.89E+00	3.53E+01	1.13E+02	21.87	116.67	31.98	9.72	88.19	282.30
Unit A-5/5/03	5/5/2003	8:15	36284.3	4.50E+01	1.20E+01	6.67E+00	3.29E+01	9.67E+01	25.88	112.50	30.00	16.68	82.25	241.75
Unit A-5/6/03	5/6/2003	8:00	36285.3	4.14E+01	1.24E+01	5.20E+00	3.20E+01	1.14E+02	26.87	41.47	12.42	5.21	32.06	114.20
Unit A-5/7/03	5/7/2003	8:20	36286.3	5.27E+01	1.54E+01	5.24E+00	4.37E+01	1.45E+02	27.88	52.70	15.40	5.24	43.70	145.00
Unit A-5/8/03	5/8/2003	8:00	36287.3	5.27E+01	1.54E+01	5.24E+00	4.37E+01	1.45E+02	28.87	131.66	38.47	13.09	109.17	362.25
Unit A-5/12/03	5/12/2003	8:15	36291.3	5.31E+01	1.70E+01	7.31E+00	4.00E+01	1.55E+02	32.88	129.38	41.42	17.81	97.46	377.65
stop	5/13/2003	4:57	36292.2	4.75E+01	1.37E+01	5.08E+00	3.60E+01	1.21E+02	33.74	20.48	5.91	2.19	15.53	52.18
Start	5/13/2003	10:40	36292.4	4.75E+01	1.37E+01	5.08E+00	3.60E+01	1.21E+02	0.00	21.36	6.16	2.28	16.19	54.41
Unit A-5/14/03	5/14/2003	8:15	36293.3	5.37E+01	1.62E+01	5.04E+00	4.31E+01	1.56E+02	0.90	50.72	15.30	4.76	40.71	147.33
Unit A-5/15/03	5/15/2003	8:00	36294.3	6.41E+01	1.65E+01	4.97E+00	5.57E+01	1.56E+02	1.89	150.57	38.76	11.67	130.84	366.44
stop	5/19/2003	1:00	36298.0	4.81E+01	1.30E+01	7.51E+00	3.31E+01	1.08E+02	5.60	89.19	24.10	13.92	61.37	200.25

Table C-1. (continued)

				Actual Data						Riemann Sums				
ID Number	Sample Date	Sample Time	Decimal Date	$CHCl_3$ (ppmv)	1,1,1-TCA (ppmv)	PCE (ppmv)	TCE (ppmv)	CCl_4 (ppmv)	Number of Days	$CHCl_3$ (ppmv/ day)	1,1,1-TCA (ppmv/ day)	PCE (ppmv/ day)	TCE (ppmv/ day)	CCl_4 (ppmv/ day)
Start	5/19/2003	12:34	36298.5	4.81E+01	1.30E+01	7.51E+00	3.31E+01	1.08E+02	0.00	20.64	5.58	3.22	14.21	46.35
Unit A-5/20/03	5/20/2003	9:10	36299.4	3.78E+01	1.37E+01	6.25E+00	2.92E+01	1.29E+02	0.86	34.40	12.47	5.69	26.57	117.40
Unit A-5/21/03	5/21/2003	8:15	36300.3	5.34E+01	1.55E+01	6.11E+00	4.26E+01	1.43E+02	1.82	52.10	15.12	5.96	41.56	139.52
Unit A-5/22/03	5/22/2003	8:00	36301.3	6.54E+01	1.69E+01	6.16E+00	5.20E+01	1.55E+02	2.81	43.92	11.35	4.14	34.92	104.09
stop	5/22/2003	16:29	36301.7	6.54E+01	1.69E+01	6.16E+00	5.20E+01	1.55E+02	3.16	11.56	2.99	1.09	9.19	27.39
Start	5/27/2003	14:08	36306.6	1.15E+01	4.81E+00	5.62E+00	7.51E+00	2.11E+01	0.00	4.28	1.79	2.09	2.80	7.85
Unit A-5/28/03	5/28/2003	8:00	36307.3	7.24E+01	2.33E+01	8.23E+00	5.18E+01	2.22E+02	0.74	63.15	20.32	7.18	45.18	193.63
Unit A-5/29/03	5/29/2003	8:00	36308.3	6.92E+01	1.90E+01	6.17E+00	5.43E+01	1.76E+02	1.74	177.69	48.79	15.84	139.43	451.92
Unit A-6/2/03	6/2/2003	11:15	36312.5	4.63E+01	1.27E+01	3.90E+00	3.29E+01	1.20E+02	5.88	116.96	32.08	9.85	83.11	303.12
Unit A-6/3/03	6/3/2003	9:15	36313.4	4.18E+01	1.04E+01	3.06E+00	2.96E+01	9.53E+01	6.80	39.19	9.75	2.87	27.75	89.34
Unit A-6/4/03	6/4/2003	8:15	36314.3	4.24E+01	1.03E+01	2.91E+00	3.12E+01	9.35E+01	7.75	41.30	10.03	2.83	30.39	91.07
Unit A-6/5/03	6/5/2003	8:00	36315.3	4.43E+01	1.07E+01	2.89E+00	3.19E+01	9.93E+01	8.74	113.98	27.53	7.44	82.08	255.49
Unit A-6/9/03	6/9/2003	11:45	36319.5	4.41E+01	1.08E+01	3.39E+00	3.24E+01	9.52E+01	12.90	110.25	27.00	8.48	81.00	238.00
Unit A-9/10/03	6/10/2003	8:00	36320.3	3.90E+01	9.53E+00	2.88E+00	2.87E+01	8.29E+01	13.74	36.16	8.84	2.67	26.61	76.86
Unit A-6/11/03	6/11/2003	8:15	36321.3	4.13E+01	9.92E+00	2.81E+00	2.98E+01	8.54E+01	14.75	40.44	9.71	2.75	29.18	83.62
stop	6/12/2003	7:00	36322.3	4.13E+01	9.92E+00	2.81E+00	2.98E+01	8.54E+01	15.70	19.57	4.70	1.33	14.12	40.48
								Total days	150.89	8,402	2,341	771	6,890	22,833
									Average/day	56	16	5	46	151
									(ft^3)	4,839	1,349	444	3,969	13,152
									n	5,594	1,559	514	4,588	15,203
									(lb)	1,472	459	188	1,329	5,155
									Total (lb)	8,603	Total Hours	3,621.43		
								Percentage of total		17%	5%	2%	15%	60%

Table C-1. (continued)

				Actual Data						Riemann Sums				
ID Number	Sample Date	Sample Time	Decimal Date	$CHCl_3$ (ppmv)	1,1,1-TCA (ppmv)	PCE (ppmv)	TCE (ppmv)	CCl_4 (ppmv)	Number of Days	$CHCl_3$ (ppmv/ day)	1,1,1-TCA (ppmv/ day)	PCE (ppmv/ day)	TCE (ppmv/ day)	CCl_4 (ppmv/ day)

1,1,1-TCA = 1,1,1-trichloroethane
CCl_4 = carbon tetrachloride
$CHCl_3$ = chloroform
PCE = tetrachloroethene
TCE = trichloroethene

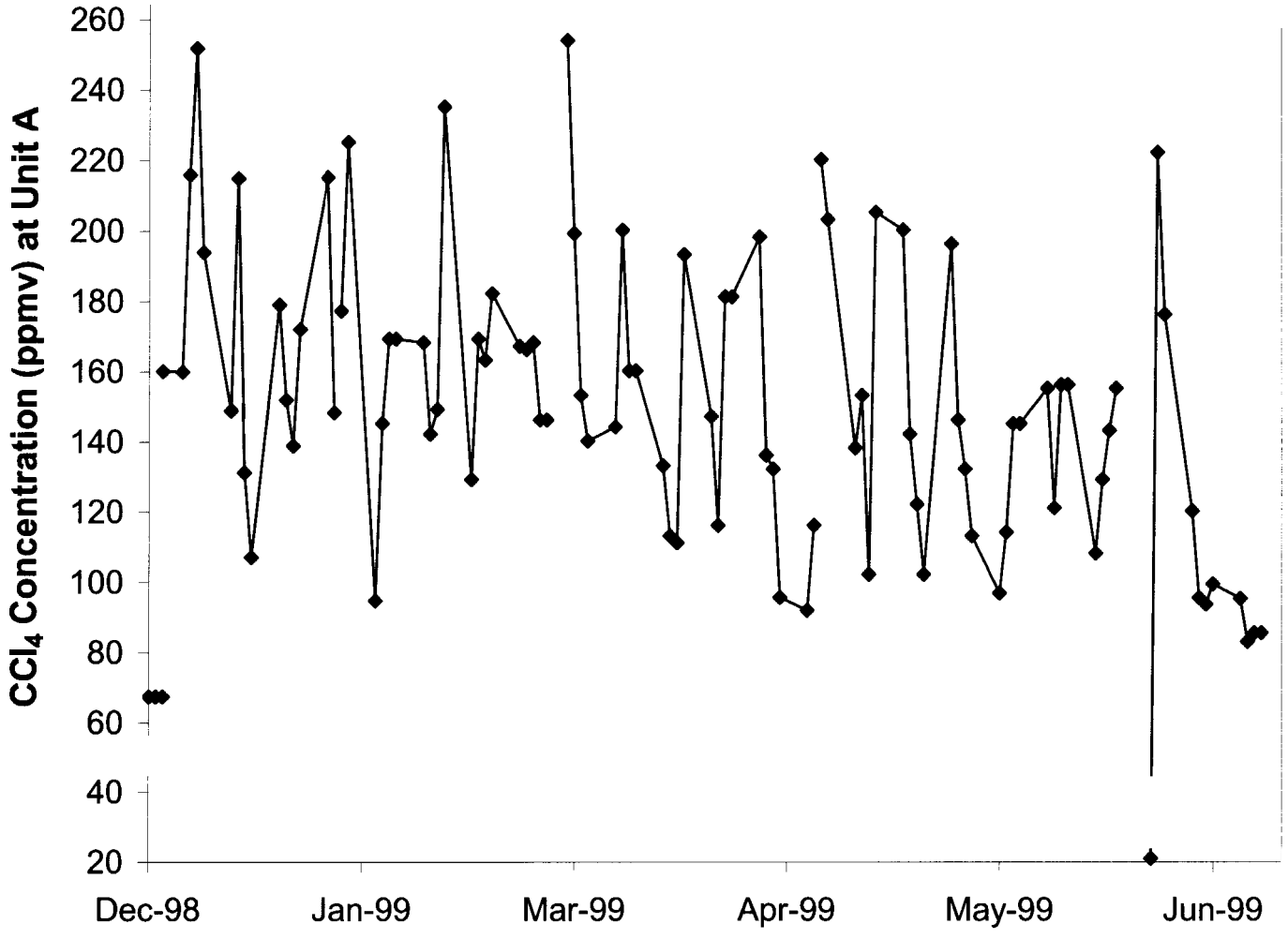

Figure C-1. Unit A mid-year 2003 inlet carbon tetrachloride sample concentration.

Table C-2. Unit B mid-year 2003 mass removal calculations

				Actual Data						Riemann Sums				
ID Number	Sample Date	Sample Time	Decimal Date	$CHCl_3$ (ppmv)	1,1,1-TCA (ppmv)	PCE (ppmv)	TCE (ppmv)	CCl_4 (ppmv)	Number of Days	$CHCl_3$ (ppmv/ day)	1,1,1-TCA (ppmv/ day)	PCE (ppmv/ day)	TCE (ppmv/ day)	CCl_4 (ppmv/ day)
Start	1/1/2003	0:00	36160.0	2.60E+01	9.50E+00	3.98E+00	2.33E+01	8.07E+01	0.00	17.33	6.33	2.65	15.53	53.80
Unit B-1/2/03	1/2/2003	8:00	36161.3	2.60E+01	9.50E+00	3.98E+00	2.33E+01	8.07E+01	1.33	29.61	10.82	4.53	26.54	91.91
stop	1/3/2003	6:40	36162.3	2.60E+01	9.50E+00	3.98E+00	2.33E+01	8.07E+01	2.28	12.28	4.49	1.88	11.00	38.11
Start	1/10/2003	12:27	36169.5	2.10E+01	1.00E+01	5.09E+00	2.29E+01	7.08E+01	0.00	4.54	2.16	1.10	4.95	15.32
stop	1/10/2003	22:50	36170.0	2.10E+01	1.00E+01	5.09E+00	2.29E+01	7.08E+01	0.43	4.54	2.16	1.10	4.95	15.32
Start	1/11/2003	15:50	36170.7	2.10E+01	1.00E+01	5.09E+00	2.29E+01	7.08E+01	0.00	18.38	8.75	4.45	20.04	61.95
Unit B-1/13/03	1/13/2003	9:50	36172.4	2.04E+01	1.09E+01	5.56E+00	2.27E+01	6.65E+01	1.75	27.82	14.87	7.58	30.96	90.70
Unit B-1/14/03	1/14/2003	9:18	36173.4	1.20E+01	4.93E+00	2.65E+00	1.20E+01	3.19E+01	2.73	11.69	4.80	2.58	11.69	31.07
Unit B-1/15/03	1/15/2003	8:35	36174.4	9.32E+00	3.28E+00	1.79E+00	8.40E+00	2.63E+01	3.70	9.07	3.19	1.74	8.17	25.59
Unit B-1/16/03	1/16/2003	8:00	36175.3	1.21E+01	1.14E+01	7.82E+00	2.15E+01	3.19E+01	4.67	31.64	29.81	20.45	56.23	83.43
Unit B-1/20/03	1/20/2003	14:07	36179.6	1.21E+01	1.14E+01	7.82E+00	2.15E+01	3.19E+01	8.93	25.74	24.25	16.64	45.74	67.87
Start	1/23/2003	17:45	36182.7	1.21E+01	1.14E+01	7.82E+00	2.15E+01	3.19E+01	0.00	21.87	20.60	14.13	38.86	57.65
Unit B-1/27/03	1/27/2003	8:30	36186.4	1.31E+01	8.42E+00	4.77E+00	1.45E+01	3.45E+01	3.61	32.18	20.68	11.72	35.62	84.75
stop	1/28/2003	15:40	36187.7	5.40E+00	2.40E+00	1.53E+00	5.09E+00	1.17E+01	4.91	3.51	1.56	0.99	3.30	7.60
Start	1/29/2003	15:48	36188.7	3.48E+00	1.52E+00	1.17E+00	3.32E+00	7.36E+00	0.00	1.17	0.51	0.39	1.12	2.48
Unit B-1/30/03	1/30/2003	8:00	36189.3	9.26E+00	4.83E+00	2.58E+00	9.89E+00	2.96E+01	0.68	21.81	11.37	6.08	23.29	69.70
Unit B-2/3/03	2/3/2003	8:50	36193.4	1.25E+01	5.51E+00	3.34E+00	1.31E+01	3.76E+01	4.71	31.32	13.80	8.37	32.82	94.20
Unit B-2/4/03	2/4/2003	8:15	36194.3	7.58E+00	3.62E+00	2.38E+00	7.99E+00	2.05E+01	5.69	11.14	5.32	3.50	11.74	30.12
stop	2/6/2003	7:21	36196.3	9.28E+00	4.17E+00	2.54E+00	9.13E+00	2.4 E+01	7.65	9.11	4.09	2.49	8.96	23.65
Start	2/6/2003	14:20	36196.6	9.28E+00	4.17E+00	2.54E+00	9.13E+00	2.4 E+01	0.00	2.98	1.34	0.82	2.93	7.74
stop	2/7/2003	5:45	36197.2	9.28E+00	4.17E+00	2.54E+00	9.13E+00	2.4 E+01	0.64	2.98	1.34	0.82	2.93	7.74

Table C-2. (continued)

				Actual Data						Riemann Sums				
ID Number	Sample Date	Sample Time	Decimal Date	$CHCl_3$ (ppmv)	1,1,1-TCA (ppmv)	PCE (ppmv)	TCE (ppmv)	CCl_4 (ppmv)	Number of Days	$CHCl_3$ (ppmv/ day)	1,1,1-TCA (ppmv/ day)	PCE (ppmv/ day)	TCE (ppmv/ day)	CCl_4 (ppmv/ day)
Start	2/7/2003	12:00	36197.5	9.28E+00	4.17E+00	2.54E+00	9.13E+00	2.41E+01	0.00	3.77	1.69	1.03	3.71	9.79
stop	2/8/2003	7:30	36198.3	9.28E+00	4.17E+00	2.54E+00	9.13E+00	2.41E+01	0.81	3.77	1.69	1.03	3.71	9.79
Start	2/8/2003	11:36	36198.5	1.71E+01	9.49E+00	4.96E+00	2.10E+01	6.31E+01	0.00	16.09	8.93	4.67	19.76	59.38
Unit B-2/10/03	2/10/2003	8:46	36200.4	1.71E+01	9.49E+00	4.96E+00	2.10E+01	6.31E+01	1.88	24.72	13.72	7.17	30.36	91.23
Unit B-2/11/03	2/11/2003	9:00	36201.4	1.67E+01	7.87E+00	3.93E+00	1.75E+01	5.38E+01	2.89	17.19	8.10	4.04	18.01	55.37
stop	2/12/2003	10:10	36202.4	1.54E+01	7.28E+00	3.75E+00	1.65E+01	4.91E+01	3.94	8.07	3.82	1.97	8.65	25.74
								Total days	29.60	404	230	134	482	1,212
									Average/day	14	8	5	16	41
									(ft^3)	233	133	77	277	698
									n	269	153	89	321	807
									(lb)	71	45	33	93	274
									Total (lb)	515		Total Hours	710.28	
								Percentage of Total		14%	9%	6%	18%	53%

1,1,1-TCA = 1,1,1-trichloroethane
CCl_4 = carbon tetrachloride
$CHCl_3$ = chloroform
PCE = tetrachloroethene
TCE = trichloroethene

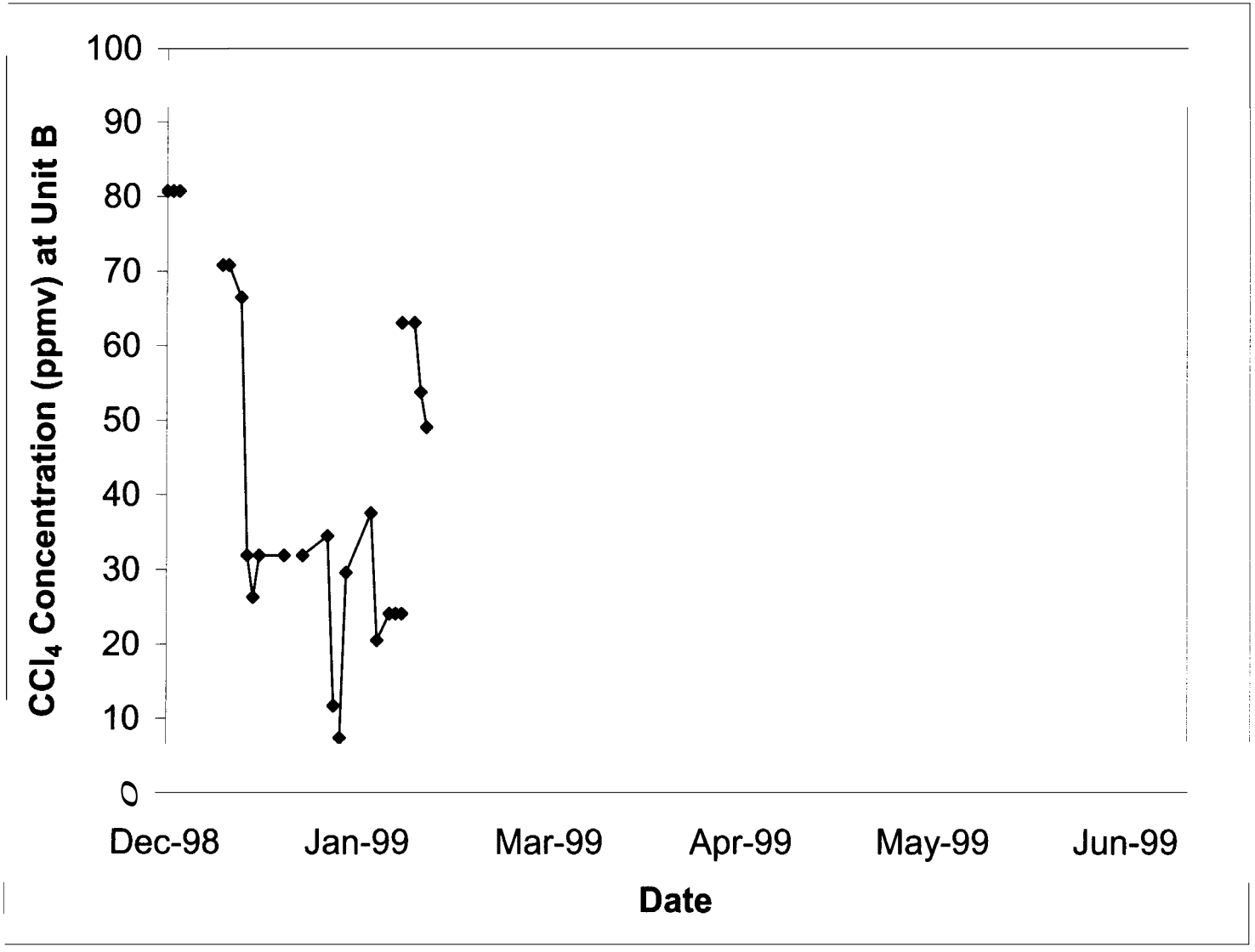

Figure C-2. Unit B mid-year 2003 inlet carbon tetrachloride sample concentration.

Table ***C-3.*** Unit D mid-year 2003 mass removal calculations

				Actual Data						Riemann Sums				
ID Number	Sample Date	Sample Time	Decimal Date	$CHCl_3$ (ppmv)	1,1,1-TCA (ppmv)	PCE (ppmv)	TCE (ppmv)	CCl_4 (ppmv)	Number of Days	$CHCl_3$ (ppmv/ day)	1,1,1-TCA (ppmv/ day)	PCE (ppmv/ day)	TCE (ppmv/ day)	CCl_4 (ppmv/ day)
Start	1/1/2003	0:00	36160.0	4.86E+00	4.04E+00	2.51E+00	7.43E+00	1.13E+01	0.00	3.24	2.69	1.67	4.95	7.53
Unit D-1/2/03	1/2/2003	8:00	36161.3	1.36E+01	1.60E+01	9.70E+00	2.99E+01	4.13E+01	1.33	15.37	18.08	10.96	33.79	46.68
Stop[a]	1/3/2003	6:15	36162.3	1.36E+01	1.60E+01	9.70E+00	2.99E+01	4.13E+01	2.26	6.30	7.42	4.50	13.86	19.14
Start	1/3/2003	16:31	36162.7	1.51E+01	1.75E+01	1.06E+01	3.01E+01	4.38E+01	0.00	19.60	22.72	13.76	39.08	56.86
Unit D-1/6/03	1/6/2003	6:50	36165.3	1.51E+01	1.75E+01	1.06E+01	3.01E+01	4.38E+01	2.60	28.54	33.08	20.04	56.90	82.79
Unit D-1/7/03	1/7/2003	11:15	36166.5	1.52E+01	1.55E+01	1.03E+01	2.85E+01	4.11E+01	3.78	15.62	15.93	10.59	29.29	42.24
Unit D-1/8/03	1/8/2003	8:10	36167.3	1.40E+01	1.27E+01	8.38E+00	2.24E+01	3.08E+01	4.65	13.05	11.84	7.81	20.88	28.71
Unit D-1/9/03	1/9/2003	8:00	36168.3	1.30E+01	1.10E+01	7.51E+00	1.96E+01	2.89E+01	5.65	33.02	27.94	19.07	49.78	73.40
Unit D-1/13/02	1/13/2003	10:05	36172.4	1.21E+01	1.14E+01	7.82E+00	2.15E+01	3.19E+01	9.73	30.65	28.88	19.81	54.46	80.80
Unit D-1/14/02	1/14/2003	9:35	36173.4	1.17E+01	1.06E+01	7.32E+00	1.98E+01	2.78E+01	0.71	11.40	10.32	7.13	19.28	27.08
Unit D-1/15/02	1/15/2003	8:50	36174.4	1.21E+01	1.05E+01	7.54E+00	2.11E+01	3.15E+01	1.68	11.70	10.15	7.29	20.40	30.46
Unit D-1/16/02	1/16/2003	8:00	36175.3	1.33E+01	1.45E+01	9.77E+00	2.73E+01	3.77E+01	2.65	33.16	36.15	24.36	68.06	93.99
Unit D-1/20/03	1/20/2003	8:30	36179.4	1.06E+01	8.29E+00	6.21E+00	1.56E+01	2.41E+01	16.67	26.78	20.95	15.69	39.42	60.89
Unit D-1/21/03	1/21/2003	9:17	36180.4	1.15E+01	9.29E+00	6.50E+00	1.63E+01	2.69E+01	17.70	11.56	9.34	6.53	16.38	27.04
Unit D-1/22/03	1/22/2003	8:45	36181.4	1.13E+01	9.77E+00	6.89E+00	1.82E+01	2.88E+01	18.68	11.00	9.51	6.71	17.71	28.03
Unit D-1/23/03	1/23/2003	8:00	36182.3	1.15E+01	1.13E+01	7.96E+00	2.18E+01	3.18E+01	19.65	28.79	28.29	19.93	54.58	79.61
Unit D-1/27/03	1/27/2003	8:55	36186.4	1.22E+01	9.62E+00	6.54E+00	1.77E+01	2.79E+01	23.68	32.46	25.59	17.40	47.09	74.23
stop	1/28/2003	15:42	36187.7	1.05E+01	9.15E+00	6.27E+00	1.72E+01	2.78E+01	24.97	6.73	5.87	4.02	11.03	17.83
Start	1/29/2003	15:30	36188.6	1.31E+01	1.73E+01	1.08E+01	3.05E+01	4.65E+01	0.00	4.50	5.95	3.71	10.48	15.98
Unit D-1/30/03	1/30/2003	8:00	36189.3	1.12E+01	1.08E+01	7.63E+00	2.15E+01	3.07E+01	0.69	26.41	25.46	17.99	50.69	72.38
Unit D-2/3/03	2/3/2003	8:40	36193.4	9.28E+00	4.17E+00	2.54E+00	9.13E+00	2.41E+01	4.72	23.22	10.43	6.35	22.84	60.29
Unit D-2/4/03	2/4/2003	8:05	36194.3	1.07E+01	1.07E+01	7.12E+00	1.90E+01	3.16E+01	5.69	11.33	11.33	7.54	20.12	33.47
Unit D-2/5/03	2/5/2003	11:30	36195.5	9.51E+00	8.73E+00	6.11E+00	1.60E+01	2.64E+01	6.83	9.44	8.66	6.06	15.88	26.20
stop	2/6/2003	7:43	36196.3	1.11E+01	1.04E+01	7.25E+00	1.98E+01	3.07E+01	7.68	4.68	4.38	3.05	8.34	12.93
Start	2/6/2003	11:42	36196.5	1.11E+01	1.04E+01	7.25E+00	1.98E+01	3.07E+01	0.00	21.56	20.20	14.08	38.45	59.62
Unit D-2/10/03	2/10/2003	8:55	36200.4	1.20E+01	9.63E+00	6.42E+00	1.86E+01	2.95E+01	3.88	29.26	23.48	15.66	45.36	71.94
Unit D-2/11/03	2/11/2003	8:45	36201.4	1.24E+01	1.09E+01	6.82E+00	1.92E+01	3.01E+01	4.88	12.27	10.79	6.75	19.00	29.79

Table ***C-3.*** (continued)

				Actual Data						Riemann Sums				
ID Number	Sample Date	Sample Time	Decimal Date	$CHCl_3$ (ppmv)	1,1,1-TCA (ppmv)	PCE (ppmv)	TCE (ppmv)	CCl_4 (ppmv)	Number of Days	$CHCl_3$ (ppmv/ day)	1,1,1-TCA (ppmv/ day)	PCE (ppmv/ day)	TCE (ppmv/ day)	CCl_4 (ppmv/ day)
Unit D-2/12/03	2/12/2003	8:25	36202.4	1.16E+01	1.16E+01	7.50E+00	2.12E+01	3.19E+01	5.86	11.42	11.42	7.38	20.87	31.40
Unit D-2/13/03	2/13/2003	8:00	36203.3	1.17E+01	9.50E+00	6.59E+00	1.81E+01	2.72E+01	6.85	29.33	23.82	16.52	45.38	68.19
Unit D-2/17/03	2/17/2003	8:45	36207.4	1.13E+01	1.10E+01	7.31E+00	2.03E+01	3.41E+01	10.88	28.23	27.48	18.26	50.71	85.19
Unit D-2/18/03	2/18/2003	7:55	36208.3	1.32E+01	1.11E+01	7.57E+00	2.01E+01	3.41E+01	11.84	13.12	12.22	8.21	21.84	36.96
Unit D-2/19/03	2/19/2003	8:50	36209.4	1.31E+01	1.22E+01	8.20E+00	2.18E+01	3.69E+01	12.88	12.92	10.72	7.68	20.13	35.36
Unit D-2/20/03	2/20/2003	8:00	36210.3	1.29E+01	1.07E+01	7.67E+00	2.01E+01	3.53E+01	13.85	36.15	30.83	19.32	57.68	96.75
Unit D-2/24/03	2/24/2003	16:25	36214.7	1.36E+01	1.16E+01	7.27E+00	2.17E+01	3.64E+01	18.20	29.68	24.58	15.57	44.02	75.72
Unit D-2/25/03	2/25/2003	8:45	36215.4	1.18E+01	9.77E+00	6.19E+00	1.75E+01	3.01E+01	18.88	10.59	8.22	5.30	15.21	26.22
Unit D-2/26/03	2/26/2003	8:45	36216.4	1.26E+01	9.78E+00	6.31E+00	1.81E+01	3.12E+01	19.88	11.32	8.92	5.76	16.73	30.12
Unit D-2/27/03	2/27/2003	8:00	36217.3	1.15E+01	9.06E+00	5.85E+00	1.70E+01	3.06E+01	20.85	13.23	10.42	6.73	19.56	35.20
Stop[a]	2/28/2003	15:58	36218.7	1.15E+01	9.06E+00	5.85E+00	1.70E+01	3.06E+01	22.18	7.66	6.03	3.90	11.32	20.38
Start	3/3/2003	10:47	36221.4	1.27E+01	1.30E+01	8.53E+00	2.48E+01	3.70E+01	0.00	5.68	5.81	3.81	11.09	16.55
Unit D-3/4/03	3/4/2003	8:15	36222.3	1.29E+01	1.16E+01	7.94E+00	2.27E+01	3.58E+01	0.89	12.26	1.03	7.55	21.58	34.03
Unit D-3/5/03	3/5/2003	8:25	36223.4	1.19E+01	1.03E+01	7.13E+00	1.95E+01	3.62E+01	1.90	12.06	0.44	7.22	19.76	36.68
stop	3/6/2003	8:53	36224.4	1.07E+01	8.89E+00	6.24E+00	1.78E+01	3.37E+01	2.92	5.45	4.53	3.18	9.07	17.18
Start	3/6/2003	11:33	36224.5	1.07E+01	8.89E+00	6.24E+00	1.78E+01	3.37E+01	0.00	20.74	7.23	12.09	34.50	65.32
Unit D-3/10/03	3/10/2003	8:35	36228.4	1.45E+01	1.21E+01	8.32E+00	2.42E+01	4.26E+01	3.88	35.68	29.78	20.47	59.55	104.83
Unit D-3/11/03	3/11/2003	9:40	36229.4	1.31E+01	1.02E+01	7.01E+00	1.96E+01	3.40E+01	4.92	12.99	10.11	6.95	19.43	33.70
Unit D-3/12/03	3/12/2003	8:10	36230.3	1.27E+01	9.05E+00	6.41E+00	1.83E+01	3.15E+01	5.86	12.26	8.74	6.19	17.66	30.41
Unit D-3/13/03	3/13/2003	8:00	36231.3	1.19E+01	1.03E+01	7.01E+00	2.01E+01	3.39E+01	6.85	29.81	25.80	17.56	50.35	84.93
Unit D-3/17/03	3/17/2003	8:25	36235.4	1.05E+01	8.10E+00	5.46E+00	1.62E+01	3.11E+01	10.87	26.29	20.28	13.67	40.56	77.86
Unit D-3/18/03	3/18/2003	8:10	36236.3	1.12E+01	9.86E+00	6.61E+00	1.97E+01	3.29E+01	11.86	11.20	9.86	6.61	19.70	32.90
Unit D-3/19/03	3/19/2003	8:25	36237.4	1.22E+01	1.18E+01	7.74E+00	2.30E+01	3.61E+01	12.87	12.16	11.76	7.71	22.92	35.97
Unit D-3/20/03	3/20/2003	8:00	36238.3	1.12E+01	9.95E+00	6.95E+00	2.03E+01	3.22E+01	13.85	29.85	26.52	18.52	54.10	85.81
Unit D-3/24/03	3/24/2003	16:20	36242.7	1.06E+01	8.95E+00	6.13E+00	1.77E+01	2.91E+01	18.20	26.54	22.41	15.35	44.31	72.85
Unit D-3/25/03	3/25/2003	8:10	36243.3	1.23E+01	1.02E+01	6.98E+00	1.91E+01	3.03E+01	18.86	10.29	8.54	5.84	15.98	25.36
Unit D-3/26/03	3/26/2003	8:30	36244.4	1.24E+01	1.04E+01	6.96E+00	1.91E+01	3.02E+01	19.87	12.36	10.36	6.94	19.03	30.10
Unit D-3/27/03	3/27/2003	8:00	36245.3	1.08E+01	8.24E+00	5.92E+00	1.65E+01	2.57E+01	20.85	26.98	20.59	14.79	41.22	64.21
Unit D-3/31/03	3/31/2003	8:25	36249.4	1.15E+01	9.09E+00	6.65E+00	1.76E+01	2.69E+01	24.87	28.77	22.74	16.64	44.03	67.30

Table ***C-3.*** (continued)

				Actual Data						Riemann Sums				
ID Number	Sample Date	Sample Time	Decimal Date	$CHCl_3$ (ppmv)	1,1,1-TCA (ppmv)	PCE (ppmv)	TCE (ppmv)	CCl_4 (ppmv)	Number of Days	$CHCl_3$ (ppmv/ day)	1,1,1-TCA (ppmv/ day)	PCE (ppmv/ day)	TCE (ppmv/ day)	CCl_4 (ppmv/ day)
Unit D-4/1/03	4/1/2003	8:05	36250.3	9.54E+00	7.27E+00	5.31E+00	1.33E+01	2.32E+01	25.86	5.78	4.40	3.22	8.06	14.06
stop	4/1/2003	13:30	36250.6	9.54E+00	7.27E+00	5.31E+00	1.33E+01	2.32E+01	26.08	1.08	0.82	0.60	1.50	2.62
Start	5/28/2003	8:45	36307.4	3.70E+01	3.75E+01	2.82E+01	8.93E+01	1.37E+02	0.00	17.92	18.16	13.66	43.25	66.36
Unit A-5/29/03	5/29/2003	8:00	36308.3	3.33E+01	2.75E+01	2.34E+01	6.69E+01	1.15E+02	0.97	88.11	72.76	61.91	177.01	304.27
Unit A-6/2/03	6/2/2003	15:45	36312.7	1.53E+01	1.01E+01	5.97E+00	2.11E+01	4.53E+01	5.29	39.37	25.99	15.36	54.29	116.55
Unit A-6/3/03	6/3/2003	11:30	36313.5	1.42E+01	9.88E+00	5.93E+00	2.03E+01	4.14E+01	6.11	13.61	9.47	5.68	19.45	39.67
Unit A-6/4/03	6/4/2003	13:45	36314.6	1.66E+01	1.19E+01	7.42E+00	2.58E+01	4.83E+01	7.21	15.39	11.03	6.88	23.92	44.78
Unit A-6/5/03	6/5/2003	8:00	36315.3	1.66E+01	1.25E+01	8.12E+00	2.75E+01	4.84E+01	7.97	42.62	32.10	20.85	70.61	124.28
Unit A-6/9/03	6/9/2003	17:00	36319.7	1.47E+01	9.52E+00	5.58E+00	1.94E+01	4.49E+01	12.34	39.00	25.25	14.80	51.46	119.11
Unit A-6/10/03	6/10/2003	15:20	36320.6	1.43E+01	9.35E+00	5.50E+00	1.95E+01	4.45E+01	13.27	11.62	7.60	4.47	15.84	36.16
Unit A-6/11/03	6/11/2003	8:00	36321.3	1.43E+01	9.35E+00	5.50E+00	1.95E+01	4.45E+01	13.97	11.82	7.73	4.55	16.11	36.77
Stop[a]	6/12/2003	7:00	36322.3	1.43E+01	9.35E+00	5.50E+00	1.95E+01	4.45E+01	14.93	6.85	4.48	2.64	9.34	21.32
								Total days	101.01	1,310	1,116	759	2,187	3,643
									Average/ day	13	11	8	22	36
									(ft^3)	754	643	437	1,260	2,099
									n	872	743	505	1,456	2,426
									(lb)	230	219	185	422	823
									Total (lb)	1,877		Total Hours 2,424.22		
								Percentage of total		12%	12%	10%	22%	44%

1,1,1-TCA = 1,1,1-trichloroethane
CCl_4 = carbon tetrachloride
$CHCl_3$ = chloroform
PCE = tetrachloroethene
TCE = trichloroethene

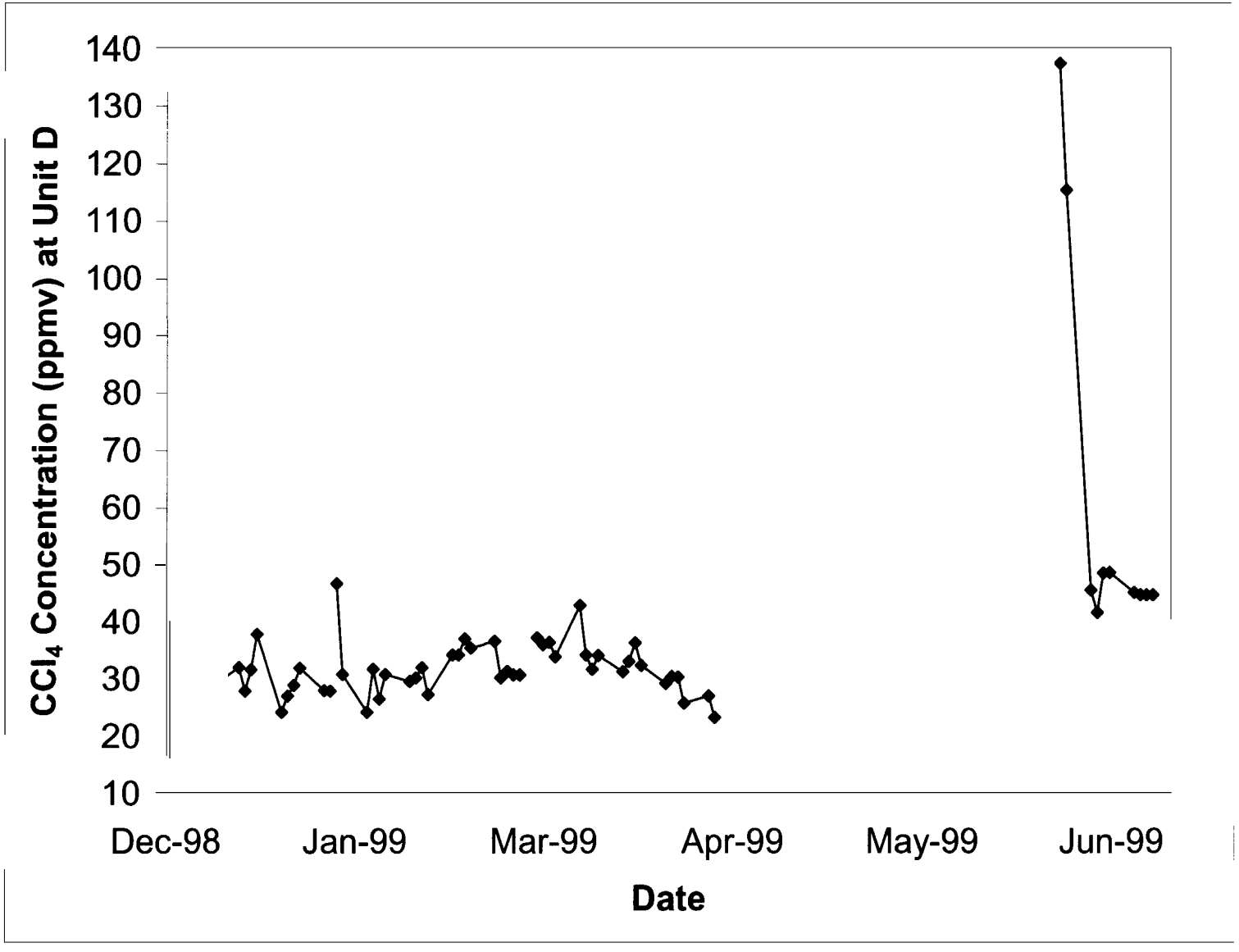

Figure C-3. Unit D mid-year 2003 inlet carbon tetrachloride sample concentration.

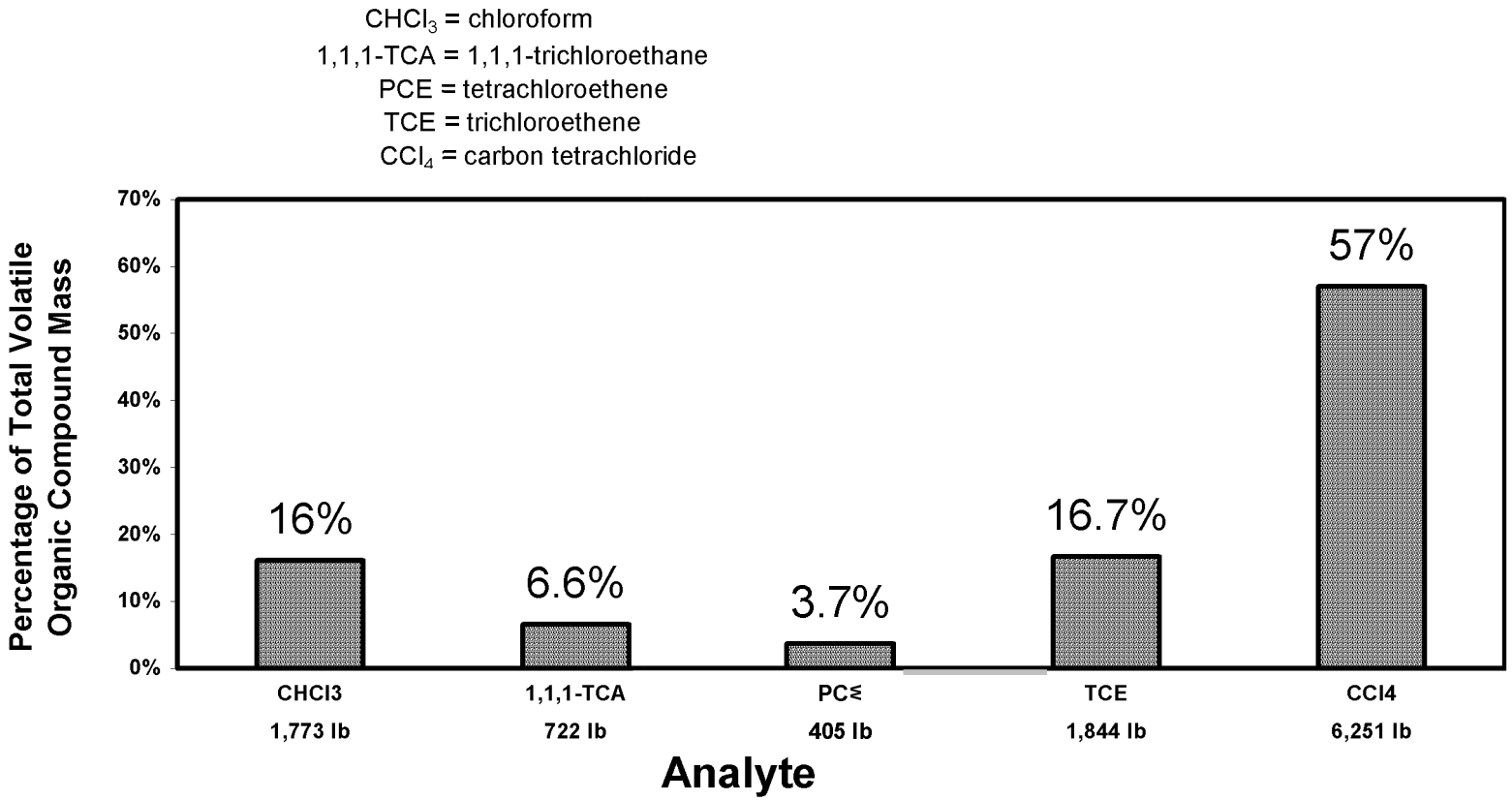

Figure C-4. Analyte mass contribution to total volatile organic compound mass during the mid-year 2003 reporting period.

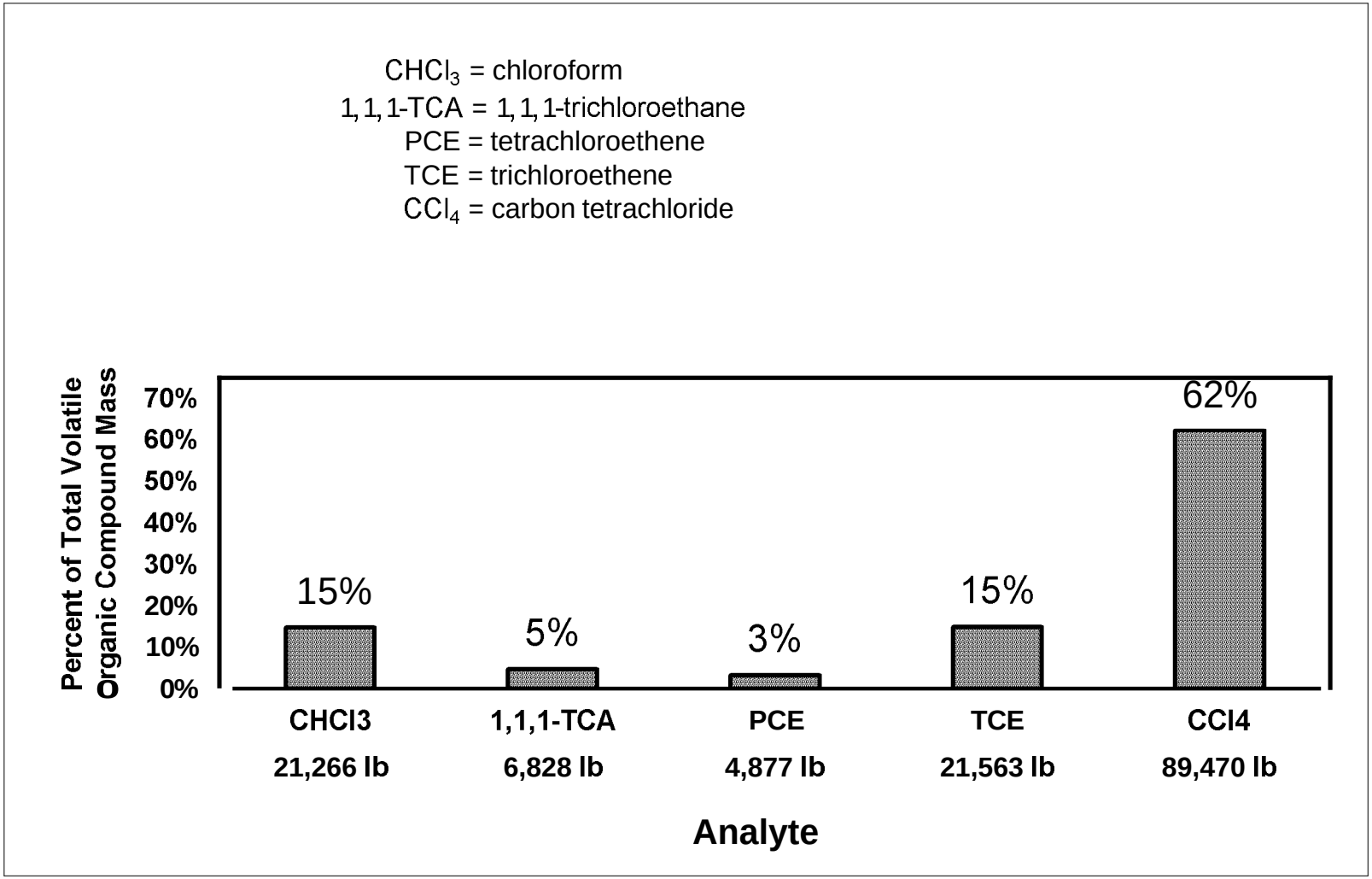

Figure C-5. Analyte mass contribution to total volatile organic compound mass (January 1996 through June 2003).

Table C-4. Breakdown per operating cycle of the mass of contaminants removed through June 2003.

Operating Period	Year	$CHCl_3$ (kg)	1,1,1-TCA (kg)	PCE (kg)	TCE (kg)	CCl_4 (kg)	Total (kg)
First 8 weeks	1996	510	151	106	461	2,277	3,505
Percentage of total		15%	4%	3%	13%	65%	—
Second 8 weeks	1996	258	80	64	247	1,203	1,853
Percentage of total		14%	4%	3%	13%	65%	—
Third 8 weeks	1996	169	51	36	151	753	1,159
Percentage of total		15%	4%	3%	13%	65%	—
First quarter	1997	196	48	28	142	857	1,270
Percentage of total		15%	4%	2%	11%	67%	—
Second quarter	1997	497	165	134	494	2,393	3,684
Percentage of total		13%	4%	4%	13%	65%	—
Third quarter	1997	291	54	65	273	1,266	1,949
Percentage of total		15%	3%	3%	14%	65%	—
Fourth quarter	1997	547	155	110	449	2,452	3,713
Percentage of total		15%	4%	3%	12%	66%	—
Midyear	1998	489	153	112	436	2,147	3,337
Percentage of total		15%	5%	3%	13%	64%	—
Endyear	1998	674	175	191	714	2,768	4,523
Percentage of total		15%	4%	4%	16%	61%	—
Midyear	1999	378	98	74	404	1,860	2,814
Percentage of total		13%	4%	3%	14%	66%	—
Endyear	1999	514	178	163	637	2,490	3,982
Percentage of total		13%	4%	4%	16%	63%	—
Midyear	2000	528	149	139	608	2,414	3,838
Percentage of total		14%	4%	4%	16%	63%	—
Endyear	2000	286	58	31	257	1,331	1,964
Percentage of total		14%	3%	2%	13%	68%	—
Midyear	2001	697	123	147	612	2,795	4,374
Percentage of total		16%	3%	3%	14%	64%	—
Endyear	2001	777	232	151	837	3,320	5,317
Percentage of total		15%	4%	3%	16%	62%	—
Midyear	2002	937	438	234	1,082	3,576	6,267
Percentage of total		15%	7%	4%	17%	57%	—
Endyear	2002	1,094	461	243	1,141	3,846	6,785
Percentage of total		16%	7%	4%	17%	57%	—
Midyear	2003	804	328	184	836	2,835	4,987
Percentage of total		16%	7%	4%	17%	57%	—

Table C-4. (continued).

Operating Period	Year	$CHCl_3$ (kg)	1,1,1-TCA (kg)	PCE (kg)	TCE (kg)	CCl_4 (kg)	Total (kg)
Total	1996–June 2003	9,646	3,097	2,212	9,781	40,583	65,319
Percentage of total		15%	5%	3%	15%	62%	—

1,1,1-TCA = 1,1,1-trichloroethane
CCl_4 = carbon tetrachloride
$CHCl_3$ = chloroform
PCE = tetrachloroethene
TCE = trichloroethene

Appendix D

Spatial and Temporal Distribution of Volatile Organic Compounds in the Vadose Zone

Appendix D

Spatial and Temporal Distribution of Volatile Organic Compounds in the Vadose Zone

Figures D-1 through D-5 represent a horizontal cross section of the distribution of the CCl_4 concentration in the **SDA** at approximately 21 m (70 ft) below ground surface. Concentration values from five different sampling events were used to prepare the plots before starting the remedial action in January 1996, January 1998, January 2000, January 2002, and June 2003. The CCl_4 concentration distribution was kriged[a] by using the Environmental Visualization System software program. Plots of current CCl_4 vapor data, at approximately 21 m (70 ft) deep, indicate an overall decrease in the areal extent of the plume when compared to data taken before operations at the same depth. The vapor data also indicate a decrease in the CCl_4 concentration at the center of the plume.

---

a. Kriging is a method of linear regression that takes into account the spatial relationship of a series of points. In this case, concentrations are estimated between actual measured data points, providing insight into what the actual concentration profile might look like at any horizontal level in the contamination zone.

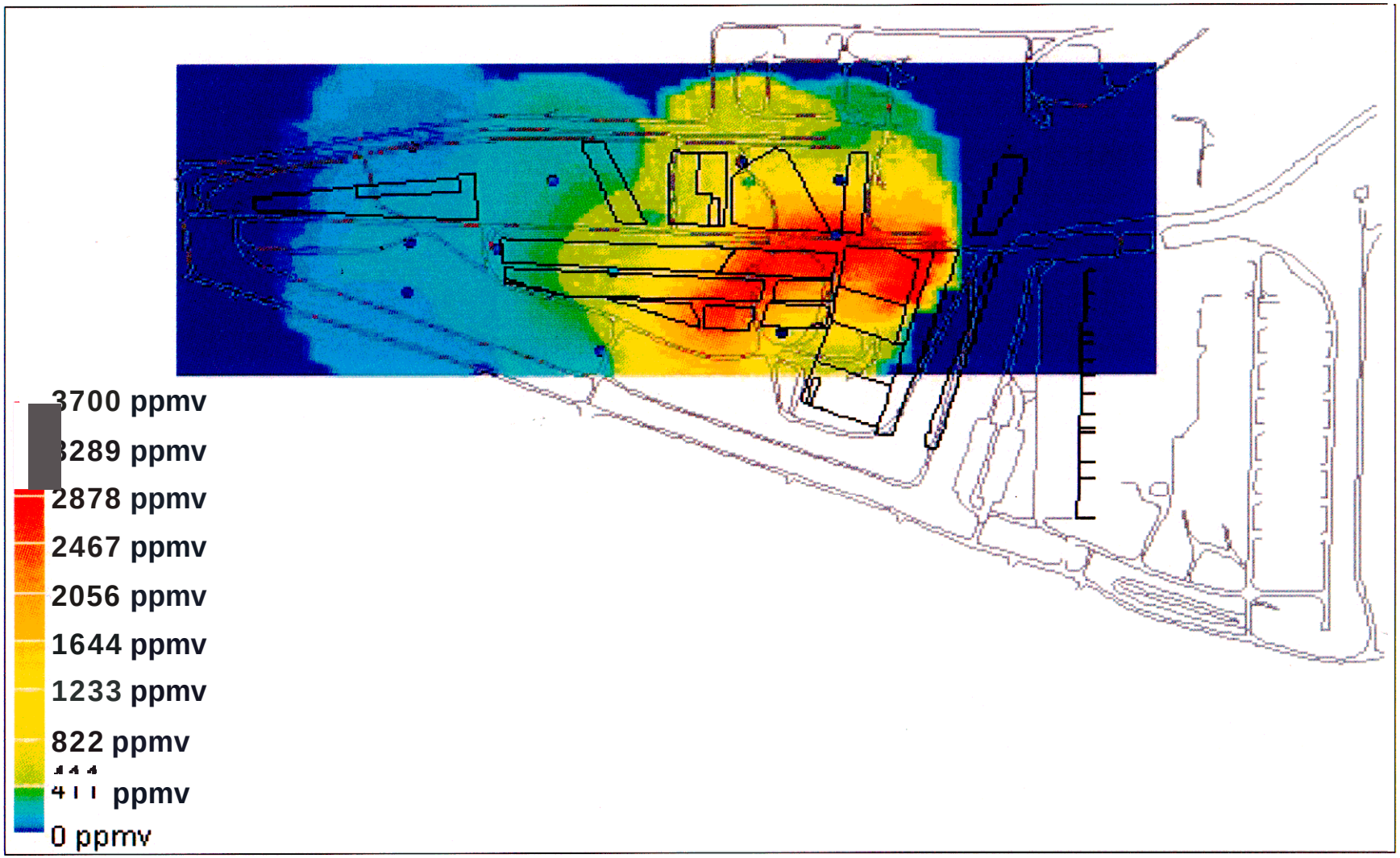

Figure D-1. Spatial distribution of volatile organic compounds in the Subsurface Disposal Area at approximately 21 m (70 ft) below ground surface in January 1996.

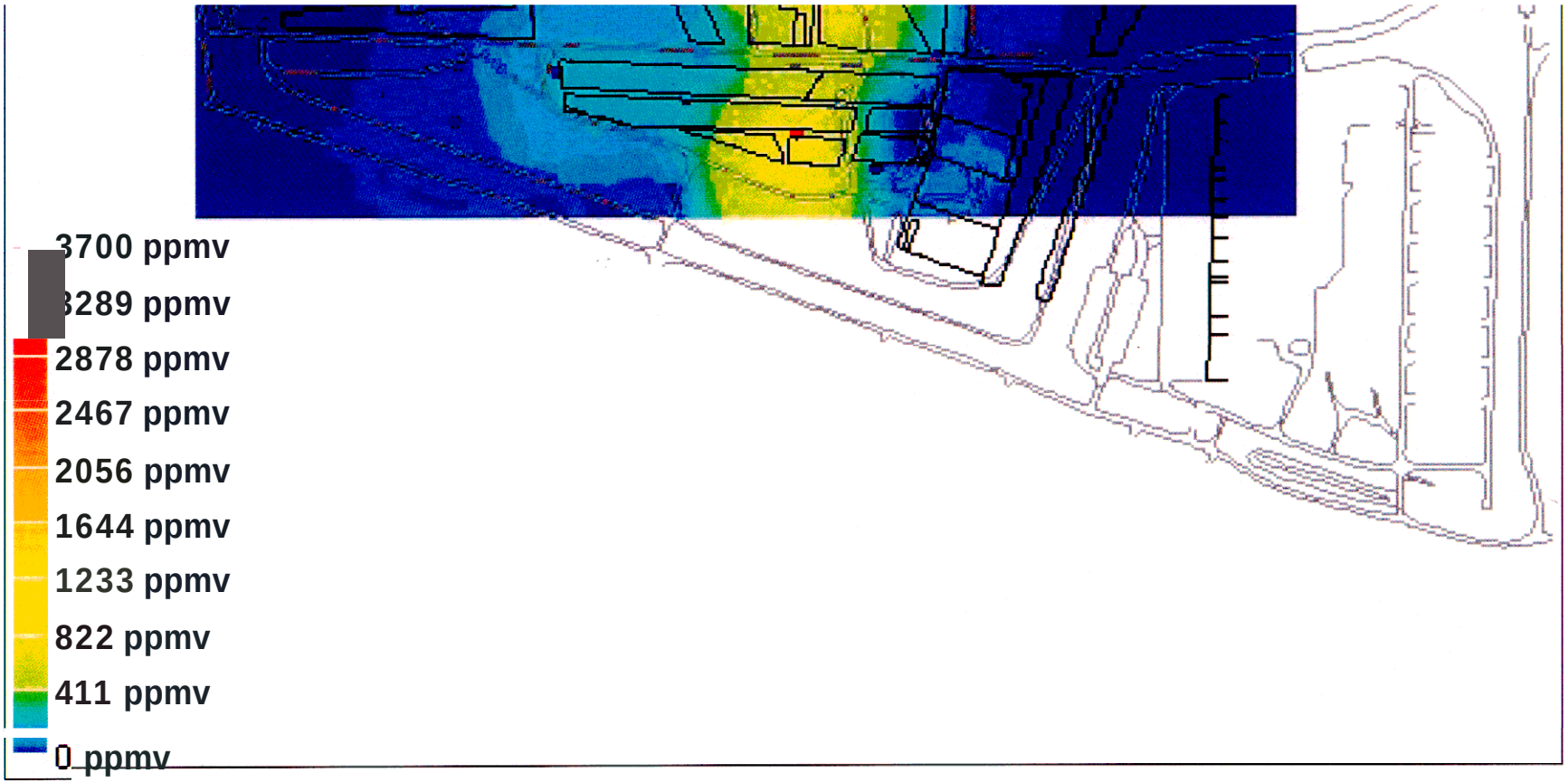

Figure D-2. Spatial distribution of volatile organic compounds in the Subsurface Disposal Area at approximately 21 m (70 ft) below ground surface in January 1998.

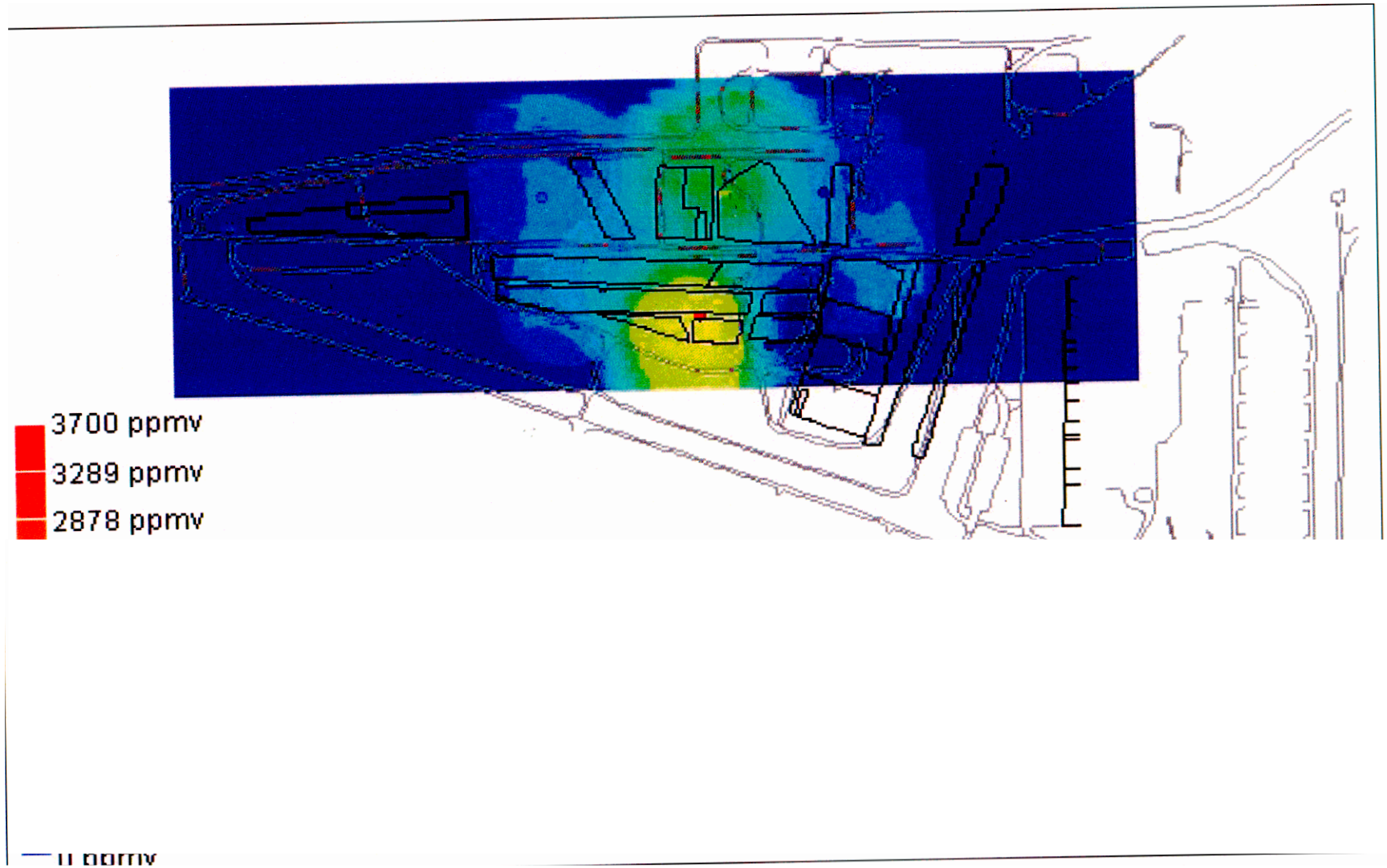

Figure D-3. Spatial distribution of volatile organic compounds in the Subsurface Disposal Area at approximately 2 m (70 ft) below ground surface in January 2000.

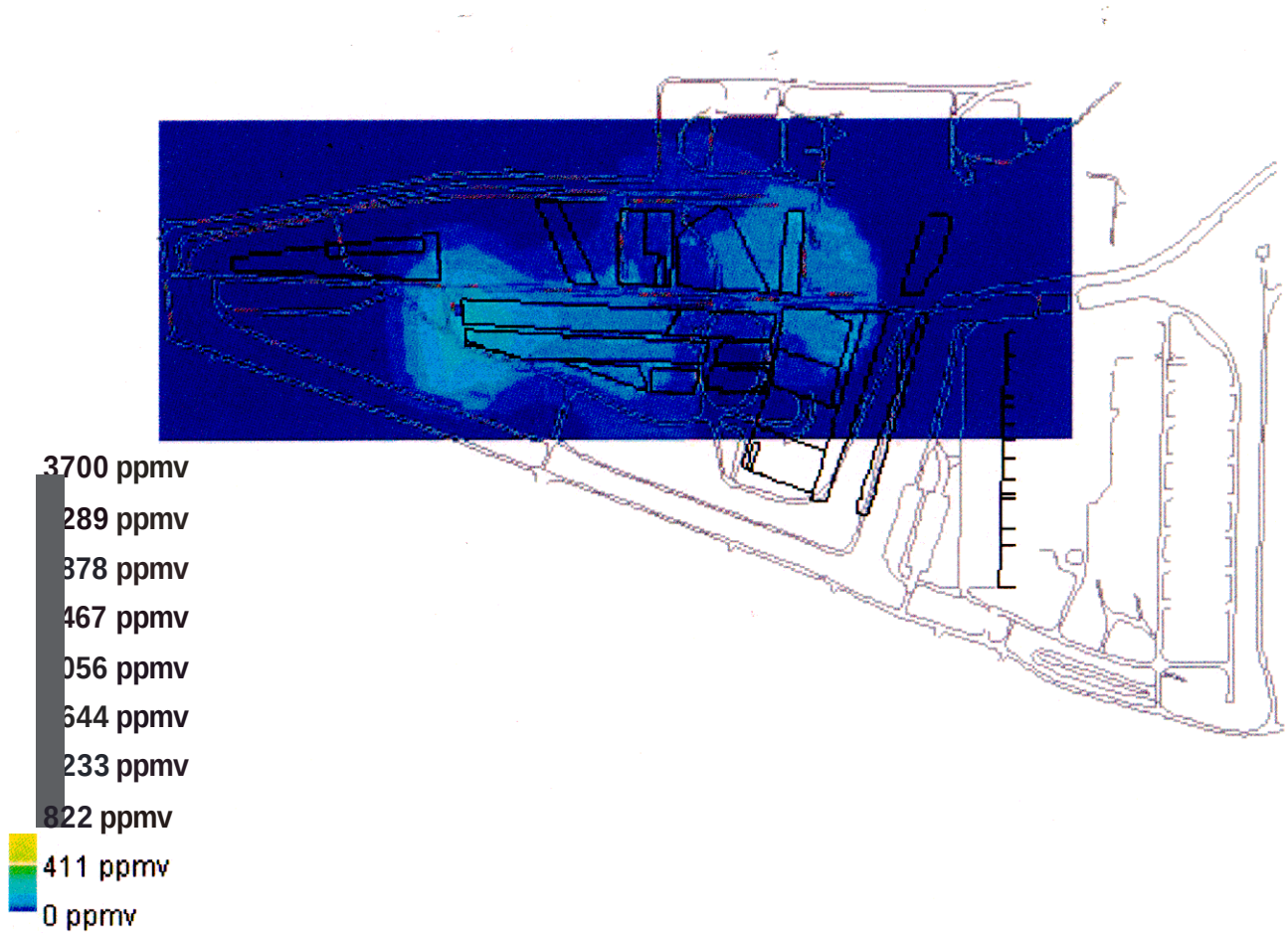

Figure D-4. Spatial distribution of volatile organic compounds in the Subsurface Disposal Area at approximately 21 m (70 ft) below ground surface in January 2002.

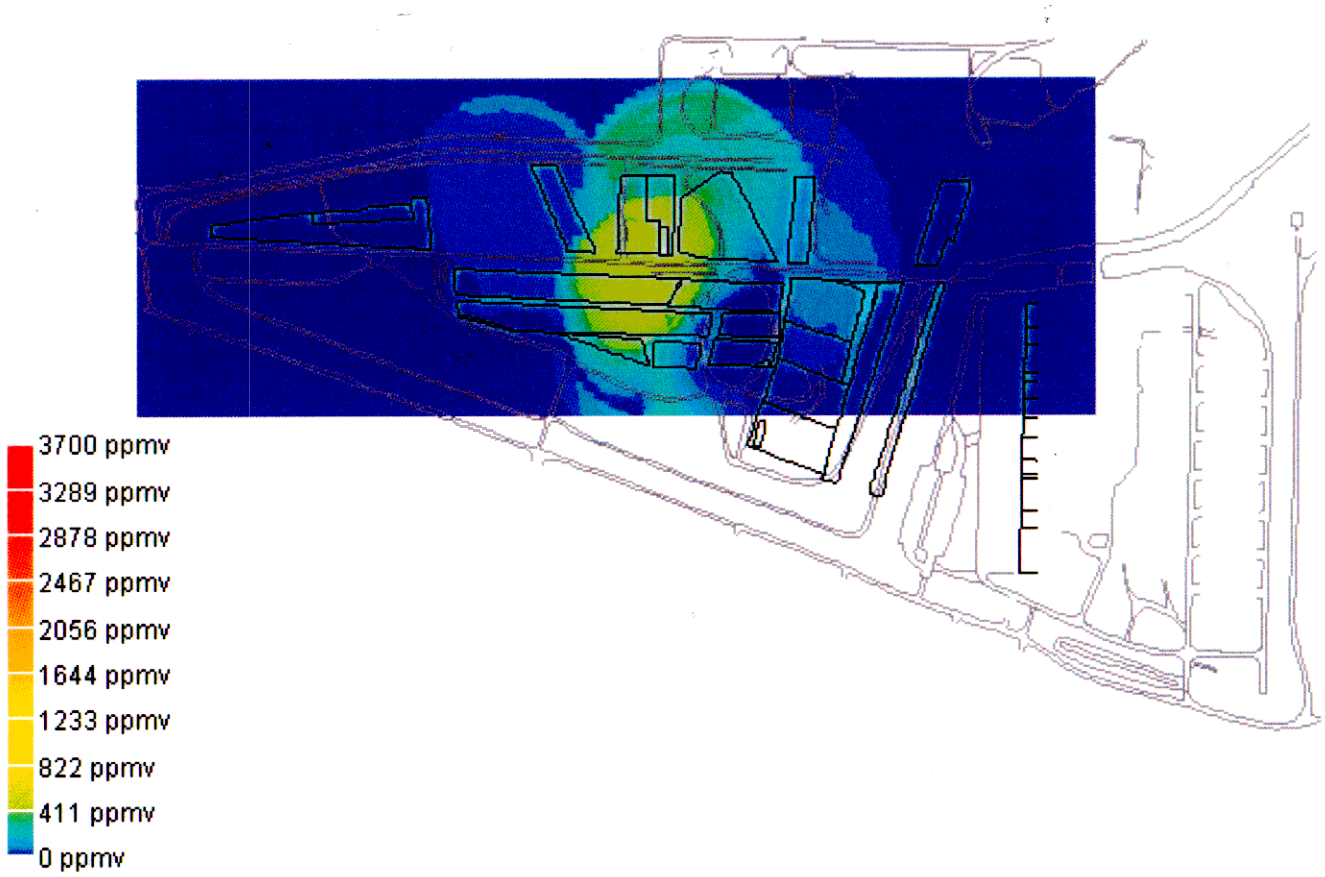

Figure D-5. Spatial distribution of volatile organic compounds in the Subsurface Disposal Area at approximately 21 m (70 ft) below ground surface in June 2003.

Appendix E

Operations History of Vacuum Vapor Extraction with Treatment Units at the Subsurface Disposal Area

Appendix E

Operations History of Vacuum Vapor Extraction with Treatment Units at the Subsurface Disposal Area

During the mid-year 2003 operations period, a goal of 80% uptime of available hours was set for operation of the VVET units at the SDA, including planned downtime for maintenance activities. Units A, B, and D achieved uptimes of 99.6, 94, and 100% of available hours, respectively. Figures E-1, E-2, and E-3 show the operation histories of the three VVET units during the mid-year 2003 operational period. Table E-1 shows the cumulative operating schedule for W E T operations through June 2003.

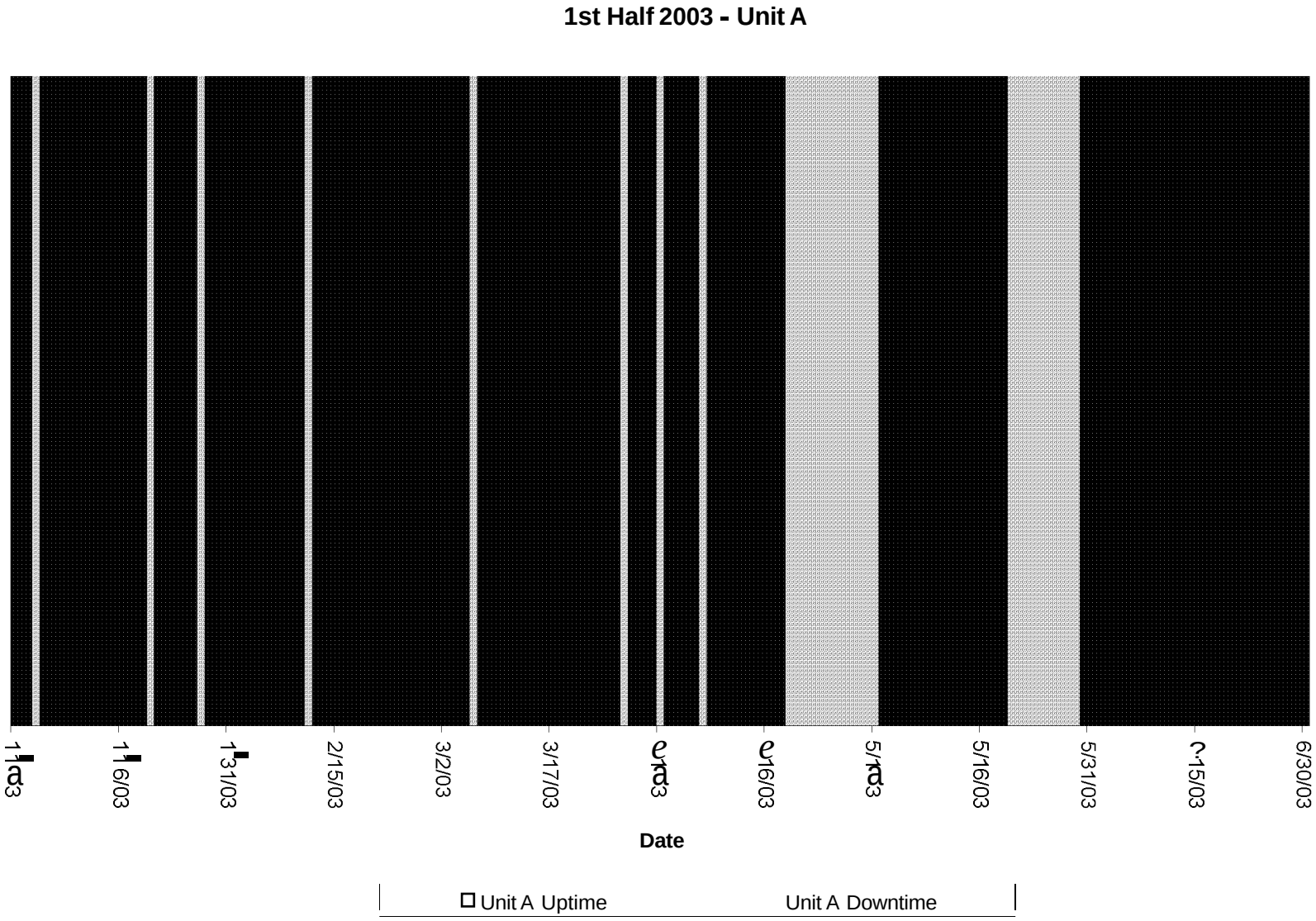

Figure E-1. Operation history of vapor vacuum extraction with treatment Unit **A** for mid-year 2003.

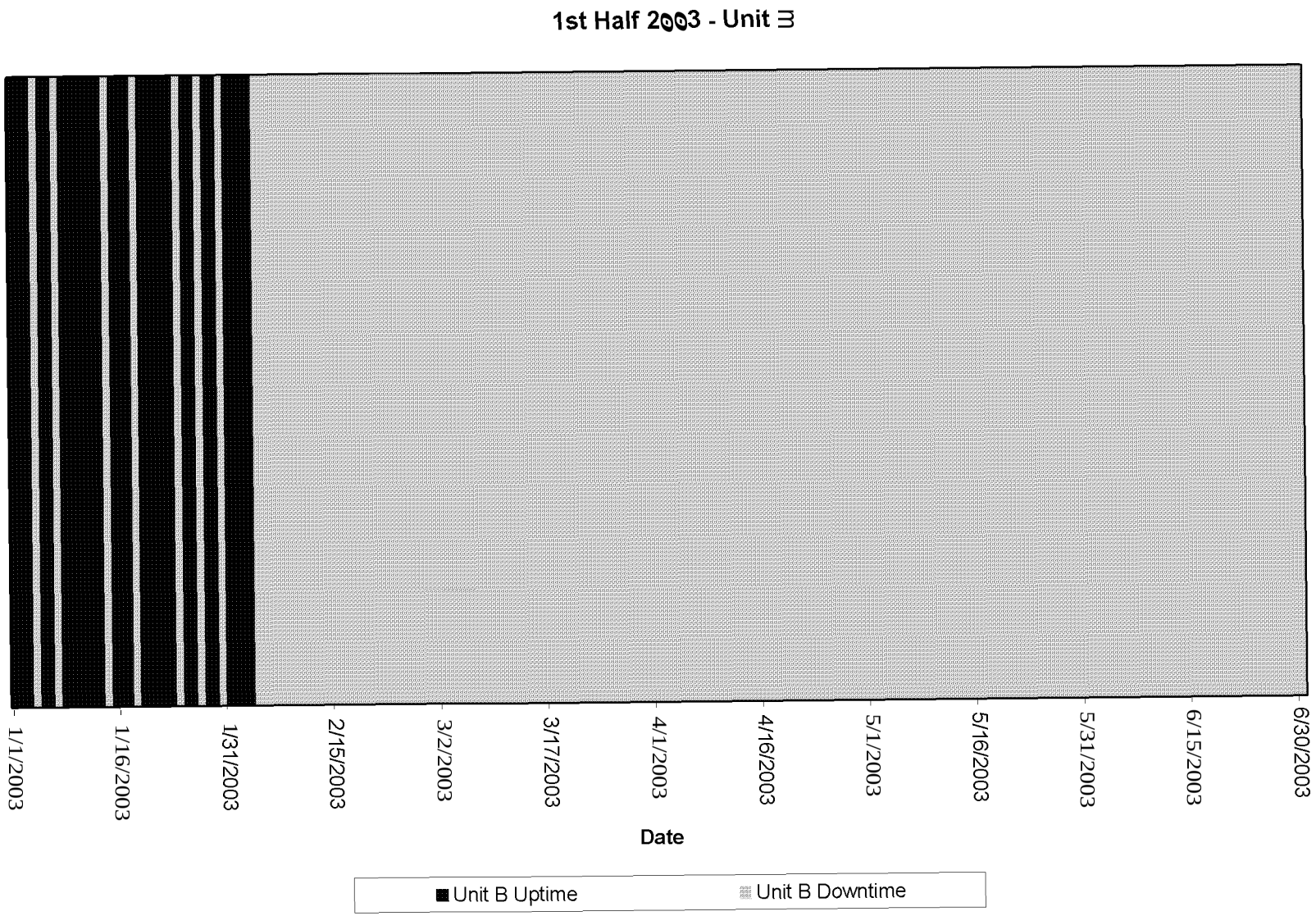

Figure E-2. Operation history of vapor vacuum extraction with treatment Unit B for mid-year 2003

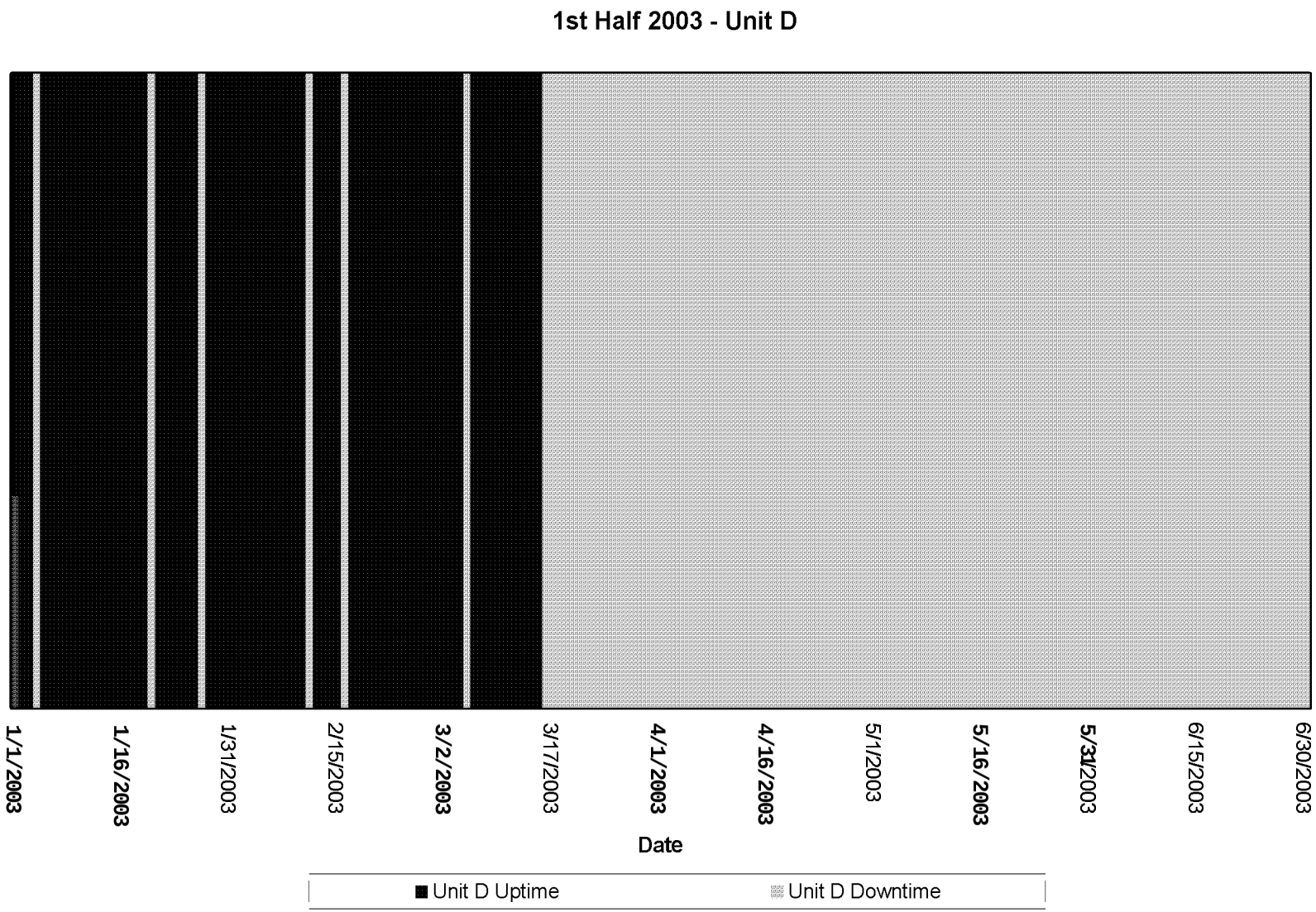

Figure E-3. Operation history of vapor vacuum extraction with treatment Unit D for mid-year 2003.

Table E-1. Cumulative operating schedule for vapor vacuum extraction with treatment operations through June 2003.

Operating Period	Year	Unit A	Unit B	Unit C	Unit D
First 8 weeks	1996				
Hours operated		1,321	1,137	1,102	—
Hours available		1,602	1,437	1,265	—
Percent operated		82%	79%	87%	—
Second 8 weeks	1996				
Hours operated		916	614	915	—
Hours available		994	971	994	—
Percent operated		92%	63%	92%	—
Third 8 weeks	1996				
Hours operated		750	640	752	—
Hours available		1,008	864	1,056	—
Percent operated		74%	74%	71%	—
First quarter	1997				
Hours operated		120	744	1,056	—
Hours available		2,952	2,952	2,952	—
Percent operated		4%	25%	36%	—
Second quarter	1997				
Hours operated		899	1,223	1,355	—
Hours available		1,023	1,531	1,633	—
Percent operated		88%	80%	83%	—
Third quarter	1997				
Hours operated		824	764	898	—
Hours available		954	817	912	—
Percent operated		86%	94%	98%	—
Fourth quarter	1997				
Hours operated		2,776	2,677	160	—
Hours available		2,845	2,840	2,848	—
Percent operated		98%	94%	6%	—
Midyear	1998				
Hours operated		2,821	2,639	0	—
Hours available		2,880	2,880	2,880	—
Percent operated		98%	92%	0%	—

Table E-1. (continued)

Operating Period	Year	Unit A	Unit B	Unit C	Unit D
Endyear	1998				
Hours operated		3,809	3,713	0	
Hours available		4,200	4,152	4,104	
Percent operated		91%	90%	0%	
Midyear	1999				
Hours operated		3,162	305	0	
Hours available		4,152	407	4,152	
Percent operated		76%	75%	0%	
Endyear	1999				
Hours operated		3,120	2,544	2,424	
Hours available		3,432	3,432	3,432	
Percent operated		91%	74%	71%	
Midyear	2000				
Hours operated		3,520	3,236	1,938	
Hours available		4,032	4,032	4,032	
Percent operated		87%	80%	48%	
Endyear	2000				
Hours operated		2,325	0	Unit C failed in spring 2000	
Hours available		3,144	3,144		
Percent operated		74%	0%		
Midyear	2001				
Hours operated		2,440	624	Unit C replaced with Unit D in spring 2001	
Hours available		4,008	4,008		
Percent operated		61%	16%		
Endyear	2001			Unit D shake down period	
Hours operated		3,049	3,712	—	—
Hours available		4,080	4,080	—	—
Percent operated		75%	91%	—	—
Midyear	2002			Shakedown complete 3/4/02	
Hours operated		3,067	3,228	—	792
Hours available (calendar hours)		3,258	3,258	—	2,142
Percent operated		94%	99%	—	37%

Table E-1. (continued).

Operating Period	Year	Unit A	Unit B	Unit C	Unit D
Endyear	2002				
Hours operated		3,743	3,947	—	3,931
Hours available (calendar hours)		4,416	4,416	—	4,416
Percent operated		85%	89.4%	—	89%
Midyear	2003				
Hours operated		3,621	710	—	2,424
Hours available (calendar hours)		4,344	4,344	—	4,344
Percent operated		83%	16%	—	56%
Total	1996 to 2003				
Hours operated		43,660	35,827	10,600	9,545
Hours available		53,324	49,565	30,260	10,902
Percent operated		81.8%	72.3%	35%	87.6%