Appendix B: Tables B-1 through B-6

Table B-1. Field activities schedule for the years 2000 and 2001.

FIELD ACITIVITES SCHEDULE FOR 2000				
DATE	**SET**	**EVENT**	**MATERIAL**	**WELLS/AREA**
8-Mar-00		Sample: Background	Soil	A, B & C Hor- Flood & Sprinkler
4-Apr-00		Sample: Background	Groundwater	1-12 Deep
11-May-00		**Sprinkler On: 6 hr sets 1.75"**		
15-May-00	1	Sample	Groundwater	6-10 Deep
19-May-00		**Sprinkler Off**		
26-May-00	2	Sample: **Flood On**	Surface Water	Head Ditch & Tail of Field
29-May-00		**Flood Off**		
30-May-00	3	Sample	Groundwater	1-12 Deep
31-May-00		**Precip apprx 1.50"**		
6-Jun-00	4	Sample	Groundwater	1-12 Deep & Shallow
10-Jun-00		**Assert Application-Air**		
11-Jun-00		Sample: Post-Assert App	Soil	A horizon- Flood & Sprinkler
14-Jun-00	5	Sample: **Sprinkler On: 8 hr sets**	Groundwater	1-12 Deep & Shallow
19-Jun-00	6	Sample	Groundwater	1-12 Deep & Shallow
21-Jun-00	7	Sample	Groundwater	1-12 Deep & Shallow
23-Jun-00		**Sprinkler Off**		
26-Jun-00	8	Sample	Groundwater	1-12 Deep & Shallow
3-Jul-00		Sample: Pre-Flood Irr, **Flood On**	Soil	A horizon- Flood
4-Jul-00		**Sprinkler On: 12 hr**		
5-Jul-00	9	Sample	Groundwater	1-12 Deep & Shallow
6-Jul-00		**Flood Off**		
7-Jul-00	10	Sample	Groundwater	1-12 Deep & Shallow
10-Jul-00	11	Sample	Groundwater	1-12 Deep & Shallow
17-Jul-00		**Sprinkler Off**		
18-Jul-00	12	Sample	Groundwater	1-12 Deep & Shallow
24-Jul-00	13	Sample	Groundwater	1-12 Deep & Shallow
24-Jul-00		Sample Post-Irr Season	Soil	A horizon- Flood & Sprinkler

FIELD ACTIVITIES SCHEDULE 2001	
24-25-Apr-01	Burn stubble
26-Apr-01	fertilizer-121-52-30 w/ farrow East 1/2
26&27-Apr-01	disced 4 acres of pigeon grass/fertilized west end
26&27-Apr-01	seeded 1202 malt barley
20-May-01	0.3" rain
24-May-01	pivot on 0.25"
27-May-01	pivot off
25-May-01	spray 2 tanks East 1/2
	MCPE 1/2 pint/acre
	Express 1/6 oz./acre
31-May-01	spray 2 1/2 tanks West 1/2
	Assert 1.5 pints /acre
	Curtail 1.75 pints /acre
	Water 12 gals/acre
3-Jun-01	0.55" rain
5-Jun-01	0.2" rain
9-Jun-01	0.4" rain
11-Jun-01	0.1" rain
12-14 June-01	0.35" rain
13-Jun-01	sprinkle wheel line in corner
15-Jun-01	pivot on about 1.5" not on test plot
18-Jun-01	0.65" rain
22-Jun-01	pivot off
24-Jun-01	0.1" rain
25-Jun-01	pivot on and flood
26-Jun-01	flood off - 6"-9" flood
27-Jun-01	0.2" rain
12-Jul-01	0.2" rain
15-Jul-01	0.4" rain
13-Jul-01	pivot off- 4.5" pivot
16-Jul-01	0.15" rain
17-Jul-01	pivot on about 0.95"
18-Jul-01	0.5" rain
20-Jul-01	pivot off
21-Jul-01	0.5" rain
30-31-July-01	2.5" rain
4-Aug-01	0.4" rain
Season total irrigation:	
	pivot 6.95"
	flood 7.5" - 10.5"
acres under flood: 8 acres	
acres under pivot: 140 acres	
Season total rainfall: 6.5"	

Table B-2. Inorganic ground-water quality for the experimental field study, April 4 and 5, 2000.

MBMG QW #	MBMG ID #	LOCATION	OWNER	SAMPLE SOURCE	WELL DEPTH (ft)	AQUIFER	SAMPLE DATE	Al (ug/l)	Sb (ug/l)	As (ug/l)	Ba (ug/l)	Be (ug/l)	B (ug/l)	Br (ug/l)	Cd (ug/l)	Cr (ug/l)	Co (ug/l)	Cu (ug/l)	Pb (ug/l)	Li (ug/l)	Mo (ug/l)	Ni (ug/l)	PO4 tot dis (mg/l)	Se (ug/l)	Ag (ug/l)	Sr (ug/l)	Tl (ug/l)	Ti (ug/l)	Va (ug/l)	Zn (ug/l)	Zr (ug/l)
2000Q0790	179257	22N02W26CCBD	OSTBERG C.	11AU	18.5	110TRRC	4/4/2000 15:15	<30	<2	<1	255	<2	40.1	<50	<2	<2	<2	<2	<2	<25	<10	11.5	<.5	3.17	<1	486	<5	<50	<5	3.08	<25
2000Q0791	179255	22N02W26CACC	OSTBERG C.	6AS	16.5	110TRRC	4/5/2000 11:30	89.2	<2	1.07	90.3	<2	104	<50	<2	<2	<2	<2	<2	30	<10	6.3	<.5	1.76	<1	403	<5	<50	5.2	2.65	<25
2000Q0792	179258	22N02W26CDAD	OSTBERG C.	12AD	21.2	110TRRC	4/4/2000 16:40	<30	<2	<1	53.2	<2	150	<50	<2	<2	<2	<2	<2	61.5	11	5.03	<.5	3.85	<1	605	<5	<50	<4	5.33	<25
2000Q0793	179254	22N02W26CDAD	OSTBERG C.	4AF	19.5	110TRRC	4/5/2000 10:15	<30	<2	<1	42.1	<2	132	<50	<2	<2	<2	<2	<2	59	11	4.54	<.5	3.03	<1	570	<5	<50	6.3	2.8	<25
2000Q0793	179254	22N02W26CDAD	OSTBERG C.	4AF	19.5	110TRRC	4/5/2000 10:15	<30	<2	<1	42.1	<2	132	<50	<2	<2	<2	<2	<2	59	11	4.54	<.5	3.03	<1	570	<5	<50	6.3	2.8	<25
2000Q0793	179254	22N02W26CDAD	OSTBERG C.	4AF	19.5	110TRRC	4/5/2000 10:15	<30	<2	<1	42.1	<2	132	<50	<2	<2	<2	<2	<2	59	11	4.54	<.5	3.03	<1	570	<5	<50	6.3	2.8	<25
2000Q0794	179253	22N02W26CDBC	OSTBERG C.	1AF	18.5	110TRRC	4/4/2000 17:40	<30	<2	<1	55.2	<2	48.9	<50	<2	<2	<2	<2	<2	31	<10	5.69	<.5	1.21	<1	558	<5	<50	5.9	2.21	<25
2000Q0794	179253	22N02W26CDBC	OSTBERG C.	1AF	18.5	110TRRC	4/4/2000 17:40	<30	<2	<1	55.2	<2	48.9	<50	<2	<2	<2	<2	<2	31	<10	5.69	<.5	1.21	<1	558	<5	<50	5.9	2.21	<25
2000Q0794	179253	22N02W26CDBC	OSTBERG C.	1AF	18.5	110TRRC	4/4/2000 17:40	<30	<2	<1	55.2	<2	48.9	<50	<2	<2	<2	<2	<2	31	<10	5.69	<.5	1.21	<1	558	<5	<50	5.9	2.21	<25
2000Q0795	179256	22N02W26CACA	OSTBERG C.	9AS	14.7	110TRRC	4/5/2000 12:45	<30	<2	<1	148	<2	52.1	<50	<2	<2	<2	<2	<2	25.5	<10	8.06	<.5	2.61	<1	457	<5	<50	<5	2.6	<25

MBMG QW #	MBMG ID #	LOCATION	OWNER	SAMPLE SOURCE	WELL DEPTH (ft)	AQUIFER	SAMPLE DATE / TIME	TDS CALC'D (mg/l)	TDS SUM (mg/l)	FLD SC (umho/cm)	LAB SC (umho/cm)	FIELD pH	LAB pH	HRDNS as CaCO3 (mg/l)	ALK AS CaCO3 (mg/l)	RYZNAR STAB IND	LANGLIER SAT IND	SAR	WATER TEMP (deg C)
2000Q0790	179257	22N02W26CCBD	OSTBERG C.	11AU	18.5	110TRRC	4/4/2000 15:15	341	502.7	625	563	7.3	7.6	295	262	6.89	0.35	0.44	6.4
2000Q0791	179255	22N02W26CACC	OSTBERG C.	6AS	16.5	110TRRC	4/5/2000 11:30	283	419.88	505	424	8.18	7.84	176	221	7.41	0.022	1.38	5.4
2000Q0792	179258	22N02W26CDAD	OSTBERG C.	12AD	21.2	110TRRC	4/4/2000 16:40	389	574.46	724	669	7.6	7.85	287	301	7.28	0.28	1.17	7.1
2000Q0793	179254	22N02W26CDAD	OSTBERG C.	4AF	19.5	110TRRC	4/5/2000 10:15	374	555.97	662	563	8.13	7.85	282	295	7.4	0.23	1.08	5.9
2000Q0793	179254	22N02W26CDAD	OSTBERG C.	4AF	19.5	110TRRC	4/5/2000 10:15	374	555.97		563		7.85	282	295				
2000Q0793	179254	22N02W26CDAD	OSTBERG C.	4AF	19.5	110TRRC	4/5/2000 10:15	374	555.97		563		7.85	282	295				
2000Q0794	179253	22N02W26CDBC	OSTBERG C.	1AF	18.5	110TRRC	4/4/2000 17:40	253	385.54	529	429		7.86	216	215	7.56	0.15	0.46	5.4
2000Q0794	179253	22N02W26CDBC	OSTBERG C.	1AF	18.5	110TRRC	4/4/2000 17:40	253	385.54	468	429	7.74	7.86	216	215				6.1
2000Q0794	179253	22N02W26CDBC	OSTBERG C.	1AF	18.5	110TRRC	4/4/2000 17:40	253	385.54		429		7.86	216	215				
2000Q0795	179256	22N02W26CACA	OSTBERG C.	9AS	14.7	110TRRC	4/5/2000 12:45	281	414.87	529	469	8.1	7.78	212	216	7.29	0.25	0.79	5.4

MBMG QW #	MBMG ID #	LOCATION	OWNER	SAMPLE SOURCE	WELL DEPTH (ft)	AQUIFER	SAMPLE DATE	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	K (mg/l)	Fe (mg/l)	Mn (mg/l)	SiO2 (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	NO3 (mg/l)	F (mg/l)	Ortho-PO4 (mg/l)
2000Q0790	179257	22N02W26CCBD	OSTBERG C.	11AU	18.5	110TRRC	4/4/2000 15:15	68.6	30.00	17.4	1.32	<.025	0.01	7	320	0	6.344	52.2	<.5	0.19	<.05
2000Q0791	179255	22N02W26CACC	OSTBERG C.	6AS	16.5	110TRRC	4/5/2000 11:30	34	22.10	42.1	0.84	0.08	0.01	8.15	270	0	3.662	36.6	2.26	0.37	<.05
2000Q0792	179258	22N02W26CDAD	OSTBERG C.	12AD	21.2	110TRRC	4/4/2000 16:40	28.5	52.40	45.4	1.04	<.025	<.005	9.35	367	0	10.7	60.2	<.5	0.37	<.05
2000Q0793	179254	22N02W26CDAD	OSTBERG C.	4AF	19.5	110TRRC	4/5/2000 10:15	25.6	52.90	41.6	0.68	<.025	<.005	9.33	359	0	8.834	56.8	<.5	1.02	<.05
2000Q0793	179254	22N02W26CDAD	OSTBERG C.	4AF	19.5	110TRRC	4/5/2000 10:15	25.6	52.90	41.6	0.68	<.025	<.005	9.33	359	0	8.834	56.8	<.5	1.02	<.05
2000Q0793	179254	22N02W26CDAD	OSTBERG C.	4AF	19.5	110TRRC	4/5/2000 10:15	25.6	52.90	41.6	0.68	<.025	<.005	9.33	359	0	8.834	56.8	<.5	1.02	<.05
2000Q0794	179253	22N02W26CDBC	OSTBERG C.	1AF	18.5	110TRRC	4/4/2000 17:40	28.8	35.00	15.4	0.63	<.025	<.005	8.56	262	0	2.277	31.5	0.94	0.62	<.05
2000Q0794	179253	22N02W26CDBC	OSTBERG C.	1AF	18.5	110TRRC	4/4/2000 17:40	28.8	35.00	15.4	0.63	<.025	<.005	8.56	262	0	2.277	31.5	0.94	0.62	<.05
2000Q0794	179253	22N02W26CDBC	OSTBERG C.	1AF	18.5	110TRRC	4/4/2000 17:40	28.8	35.00	15.4	0.63	<.025	<.005	8.56	262	0	2.277	31.5	0.94	0.62	<.05
2000Q0795	179256	22N02W26CACA	OSTBERG C.	9AS	14.7	110TRRC	4/5/2000 12:45	43	25.30	26.3	1.13	<.025	<.005	7.74	263	0	5.785	42.3	<.5	0.28	<.05

Table B-3. Assert reults and field parameters for flood- and sprinkler- test plot wells.

Sample Location	Date Sampled	Field pH	Field Temp. C	Assert (ug/L)	Assert-Met (ug/L)
1A	04/03/00	6.1	6.0	ND	ND
1A	05/30/00	7.2	6.0	ND	ND
1A	06/07/00	7.4	8.8	ND	ND
1A	06/14/00	7.0	8.4	ND	ND
1A	06/19/00	7.2	8.2	ND	ND
1A	06/26/00	7.6	8.9	ND	ND
1A	07/05/00	NA	9.7	ND	ND
1A	07/07/00	NA	NA	ND	ND
1A	07/10/00	NA	10.1	ND	ND
1A	07/18/00	8.1	9.6	ND	ND
1A	07/24/00	7.4	11.2	ND	ND
1A	03/08/01			ND	0.4
1A	05/16/01			ND	ND
1A	05/23/01	7.7	8.9	ND	0.3
1A	05/28/01			ND	ND
1A	06/02/01			ND	ND
1A	06/04/01	7.5	7.9	ND	0.3
1A	06/12/01	7.7	6.9	ND	ND
1A	06/18/01	7.5	8.6	ND	0.2
1A	06/20/01	7.5	8.8	ND	ND
1A	06/22/01	7.6	8.9	ND	ND
1A	06/25/01	7.7	15	ND	ND
1A	06/26/01			ND	0.2
1A	06/27/01	7.5	9.2	ND	ND
1A	06/28/01	7.5	9.3	ND	0.3
1A	06/29/01	7.6	9.7	ND	ND
1A	06/30/01	7.3	9.1	ND	0.4
1A	07/02/01	7.6	10.1	ND	ND
1A	07/05/01	8.0	10.3	ND	0.6
1A	07/09/01	8.2	9.9	0.3	0.8
1A	07/16/01	8.1	10.2	0.6	1.1
1A	07/23/01	8.1	10.4	ND	ND
1A	07/30/01	8.1	10.3	0.7	1.3
1A	08/03/01	7.9	11.4	ND	ND
1A	08/06/01	8.0	12	0.5	0.9
1A	08/13/01	8.2	11.5	ND	ND
1A	08/21/01	7.6	11.7	0.4	0.8
1B	06/07/00	8.0	11.1	ND	ND
1B	06/14/00	7.3	8.9	ND	ND
1B	06/19/00	7.3	9.4	ND	ND
1B	06/26/00	7.8	10.0	ND	ND
1B	07/05/00	NA	10.3	ND	ND
1B	07/07/00	NA	NA	ND	ND
1B	07/11/00	NA	10.5	ND	ND
1B	07/18/00	7.8	12.9	ND	ND
1B	07/24/00	7.7	12.7	ND	ND
1B	03/08/01			ND	0.5
1B	05/16/01			ND	ND
1B	05/23/01			ND	ND
1B	05/28/01			ND	ND
1B	06/02/01			ND	ND
1B	06/04/01	7.7	8.3	ND	0.4
1B	06/12/01	7.9	8	ND	ND
1B	06/18/01	7.8	9.5	ND	0.3
1B	06/20/01	7.8	9.5	ND	ND
1B	06/22/01	7.8	9.2	ND	ND
1B	06/25/01	8.0	13.6	ND	ND
1B	06/26/01			ND	0.4

Note: ND = no detections above the limit of quantitation of 0.2 ug/L

Table B-3. Assert reults and field parameters for flood- and sprinkler- test plot wells.

Sample Location	Date Sampled	Field pH	Field Temp. C	Assert (ug/L)	Assert-Met (ug/L)
1B	06/27/01	7.7	9.8	ND	ND
1B	06/28/01	7.8	10.5	0.3	1.2
1B	06/28/01	7.6	10.9	ND	ND
1B	06/30/01	7.8	10.2	0.3	1.6
1B	07/02/01	7.8	11.4	ND	ND
1B	07/05/01	7.8	11.7	0.9	2.1
1B	07/09/01	8.0	11.8	1.1	2.0
1B	07/16/01	8.0	11.8	0.7	1.7
1B	07/23/01	8.1	12.2	ND	ND
1B	07/30/01	7.9	11.7	0.9	1.4
1B	08/03/01	7.7	12.5	ND	ND
1B	08/06/01	7.8	13	0.7	1.0
1B	08/13/01	8.2	13.4	ND	ND
1B	08/21/01	7.4	12.9	0.7	1.0
2A	04/03/00	6.6	7.0	ND	0.2
2A	05/30/00	7.3	8.0	ND	ND
2A	06/07/00	7.8	10.0	ND	ND
2A	06/14/00	7.4	8.7	ND	ND
2A	06/19/00	7.5	8.8	ND	ND
2A	06/21/00	7.7	9.5	ND	0.2
2A	06/26/00	7.9	8.8	ND	ND
2A	07/05/00	NA	10.4	ND	0.3
2A	07/07/00	NA	NA	ND	0.2
2A	07/10/00	NA	10.8	ND	0.2
2A	07/18/00	7.6	11.2	ND	0.2
2A	07/24/00	7.6	11.8	ND	0.3
2A	03/08/01			0.2	0.6
2A	05/16/01			ND	ND
2A	05/23/01	7.7	8.2	ND	0.4
2A	05/28/01			ND	ND
2A	06/02/01			ND	ND
2A	06/04/01	7.6	7.4	ND	0.4
2A	06/12/01	7.6	7.4	ND	ND
2A	06/18/01	7.6	8	ND	0.4
2A	06/20/01	7.6	9.3	ND	ND
2A	06/22/01	7.6	9.1	ND	ND
2A	06/25/01	8.0	12.7	ND	ND
2A	06/26/01			0.2	0.4
2A	06/27/01	7.4	9.9	ND	ND
2A	06/28/01	7.4	9.8	2.9	3.8
2A	06/29/01	7.4	10.7	ND	ND
2A	06/30/01	7.6	10	1.9	4.0
2A	07/02/01	7.5	10.5	ND	ND
2A	07/05/01	7.9	10.3	1.0	1.4
2A	07/09/01	8.1	10.7	ND	ND
2A	07/16/01	8.1	10.4	0.4	1.2
2A	07/23/01	8.1	11.7	ND	ND
2A	07/30/01	8.1	10.7	0.5	1.4
2A	08/03/01	7.9	11.8	0.6	1.5
2A	08/06/01	8.0	12.1	0.3	1.3
2A	08/13/01	8.3	12.2	ND	ND
2A	08/21/01	7.6	11.7	0.5	1.2
2B	06/07/00	7.9	10.0	ND	0.3
2B	06/14/00	7.5	8.9	ND	0.3
2B	06/19/00	7.4	9.5	ND	0.3
2B	06/21/00	7.7	9.9	ND	0.3
2B	06/26/00	7.9	9.5	ND	0.3
2B	07/05/00	NA	10.9	ND	0.2

Note: ND = no detections above the limit of quantitation of 0.2 ug/L

Table B-3. Assert reults and field parameters for flood- and sprinkler- test plot wells.

Sample Location	Date Sampled	Field pH	Field Temp. C	Assert (ug/L)	Assert-Met (ug/L)
2B	07/07/00	NA	NA	ND	0.2
2B	07/10/00	NA	11.1	ND	0.3
2B	07/18/00	7.8	11.8	ND	0.3
2B	07/24/00	7.7	12.2	ND	0.3
2B	03/08/01			0.2	0.8
2B	05/16/01			ND	ND
2B	05/23/01			ND	ND
2B	05/28/01			ND	ND
2B	06/02/01			ND	ND
2B	06/04/01			ND	ND
2B	06/12/01			ND	ND
2B	06/18/01	7.8	8.8	ND	0.6
2B	06/20/01	7.7	9.5	ND	ND
2B	06/22/01	7.8	9.6	ND	0.5
2B	06/25/01	8.0	14.5	ND	0.5
2B	06/26/01			2.0	4.8
2B	06/27/01	7.7	10.6	5.1	6.8
2B	06/28/01	7.6	10.9	5.1	5.4
2B	06/29/01	7.4	11	8.3	10.0
2B	06/30/01	7.7	10.9	3.0	5.0
2B	07/02/01	7.8	11.9	ND	ND
2B	07/05/01	7.8	12.7	1.4	1.8
2B	07/09/01	8.0	12.1	ND	ND
2B	07/16/01	7.9	12.1	0.7	1.1
2B	07/23/01	8.0	13.2	ND	ND
2B	07/30/01	8.0	12	0.9	1.8
2B	08/03/01	7.7	13	ND	ND
2B	08/06/01	7.8	13	0.4	2.0
2B	08/13/01	8.1	13.4	ND	ND
2B	08/21/01	7.3	12.9	0.6	2.1
3A	04/03/00	7.4	8.0	ND	ND
3A	05/30/00	7.4	8.0	ND	ND
3A	06/07/00	7.4	9.6	ND	ND
3A	06/14/00	7.3	9.0	ND	ND
3A	06/19/00	7.4	9.1	ND	ND
3A	06/26/00	7.3	9.0	ND	ND
3A	07/05/00	NA	9.9	ND	ND
3A	07/07/00	NA	NA	ND	0.2
3A	07/10/00	NA	11.0	ND	ND
3A	07/18/00	7.9	11.6	ND	ND
3A	07/24/00	7.6	12.2	ND	ND
3A	03/08/01			0.4	1.6
3A	05/16/01			ND	ND
3A	05/23/01	7.8	8.8	0.2	1.2
3A	05/28/01		9.5	ND	ND
3A	06/02/01		9.6	ND	ND
3A	06/04/01	7.8	14.5	ND	1.0
3A	06/12/01	7.8		ND	ND
3A	06/18/01	7.7	10.6	0.2	1.0
3A	06/20/01	7.6	10.9	ND	ND
3A	06/22/01	7.5	11	0.2	1.4
3A	06/25/01	8.1	10.9	ND	ND
3A	06/26/01		11.9	0.4	1.5
3A	06/27/01	7.3	12.7	ND	ND
3A	06/28/01	7.5	12.1	0.2	1.4
3A	06/29/01	7.6	12.1	ND	ND
3A	06/30/01	7.8	13.2	0.2	1.4

Note: ND = no detections above the limit of quantitation of 0.2 ug/L

Table B-3. Assert reults and field parameters for flood- and sprinkler- test plot wells.

Sample Location	Date Sampled	Field pH	Field Temp. C	Assert (ug/L)	Assert-Met (ug/L)
3A	07/02/01	7.7	12	ND	ND
3A	07/05/01	7.9	13	ND	1.2
3A	07/09/01	8.2	13	ND	ND
3A	07/16/01	8.1	13.4	ND	1.1
3A	07/23/01	8.2	12.9	ND	ND
3A	07/30/01	8.2	12.8/10.7	0.3	1.3
3A	08/03/01	7.9	17.9/11.6	ND	ND
3A	08/06/01	8.0	20.4/13.2	0.2	1.3
3A	08/13/01			ND	ND
3A	08/21/01	7.7	16.5/11.9	0.3	1.1
3B	06/07/00	7.3	12.3	ND	ND
3B	06/14/00	7.7	9.9	ND	ND
3B	06/19/00	7.3	9.6	ND	ND
3B	06/26/00	7.9	10.4	ND	ND
3B	07/05/00	NA	12.0	1.9	2.3
3B	07/07/00	NA	NA	2.2	2.9
3B	07/10/00	NA	12.3	1.0	1.4
3B	07/18/00	7.9	13.2	0.3	0.7
3B	07/24/00	7.8	13.6	0.2	0.3
3B	03/08/01			0.5	1.6
3B	05/16/01			ND	ND
3B	05/23/01			ND	ND
3B	05/28/01			ND	ND
3B	06/02/01			ND	ND
3B	06/04/01			ND	ND
3B	06/12/01	8.0	8.8	ND	ND
3B	06/18/01	7.9	10.2	0.2	1.2
3B	06/20/01	7.8	10.2	ND	ND
3B	06/22/01	7.8	11.1	0.2	1.6
3B	06/25/01	8.0	11.8	ND	1.3
3B	06/26/01			3.4	2.9
3B	06/27/01	7.4	12.8	ND	ND
3B	06/28/01	7.8	12.1	0.9	3.2
3B	06/29/01	7.9	11.6	ND	ND
3B	06/30/01	7.8	12.2	0.5	3.2
3B	07/02/01	7.8	12.6	ND	ND
3B	07/05/01	7.9	13	0.5	2.2
3B	07/09/01	8.0	12.9	ND	ND
3B	07/16/01	7.9	12.9	0.7	2.1
3B	07/23/01	8.0	13.2	ND	ND
3B	07/30/01	8.0	12.2	0.6	1.9
3B	08/03/01	7.8	13.4	ND	ND
3B	08/06/01	8.0	14	0.6	1.6
3B	08/13/01			ND	ND
3B	08/21/01	7.4	13.6	0.3	1.6
4A	04/03/00	6.3	7.0	ND	0.5
4A	06/19/00	7.2	8.7	ND	0.5
4A	06/21/00	7.5	10.4	ND	0.5
4A	07/07/00	NA	NA	0.8	0.9
4A	03/08/01			0.2	0.6
4A	05/16/01			ND	ND
4A	05/23/01	7.7	8.1	ND	0.7
4A	05/28/01			ND	ND
4A	06/02/01			ND	ND
4A	06/04/01	7.5	7.8	ND	0.6
4A	06/12/01	7.9	7.3	ND	ND
4A	06/18/01	7.6	9.1	ND	0.7
4A	06/20/01	7.5	9.5	ND	ND

Note: ND = no detections above the limit of quantitation of 0.2 ug/L

Table B-3. Assert reults and field parameters for flood- and sprinkler- test plot wells.

Sample Location	Date Sampled	Field pH	Field Temp. C	Assert (ug/L)	Assert-Met (ug/L)
4A	06/22/01	7.5	9.5	ND	0.7
4A	06/25/01	8.0	8.8	ND	0.8
4A	06/26/01			ND	0.7
4A	06/27/01	7.0	10.2	ND	ND
4A	06/28/01	7.6	9.7	1.0	2.2
4A	06/29/01	7.5	10.4	ND	ND
4A	06/30/01	7.8	9.8	0.4	2.0
4A	07/02/01	7.7	12	ND	ND
4A	07/05/01	7.9	10.4	0.4	1.0
4A	07/09/01	8.1	10.8	ND	ND
4A	07/16/01	8.1	10.9	ND	0.9
4A	07/23/01	8.1	11.8	ND	ND
4A	07/30/01	8.1	11	0.3	0.9
4A	08/03/01	7.9	12.2	ND	ND
4A	08/06/01	8.0	12.6	0.2	0.9
4A	08/13/01	8.3	12.5	ND	ND
4A	08/21/01	7.6	12.3	ND	1.0
4B	06/19/00	7.3	10.3	ND	0.6
4B	06/21/00	7.6	10.5	0.2	0.7
4B	07/07/00	NA	NA	0.8	1.1
4B	03/08/01			0.2	0.6
4B	05/16/01			ND	ND
4B	05/23/01			ND	ND
4B	05/28/01			ND	ND
4B	06/02/01			ND	ND
4B	06/04/01			ND	ND
4B	06/12/01			ND	ND
4B	06/18/01	7.8	9.5	ND	0.7
4B	06/20/01	7.8	10.9	ND	ND
4B	06/22/01	7.7	9.8	ND	0.8
4B	06/25/01	8.0	12	ND	0.6
4B	06/26/01			ND	0.6
4B	06/27/01	7.7	10.4	ND	ND
4B	06/28/01	7.8	11.8	0.5	2.4
4B	06/29/01	7.8	11.4	ND	ND
4B	06/30/01	7.8	11.3	0.4	1.9
4B	07/02/01	7.8	12.2	ND	ND
4B	07/05/01	7.8	1.7	0.3	1.3
4B	07/09/01	7.9	12.1	ND	ND
4B	07/16/01	7.9	12.1	ND	1.2
4B	07/23/01	8.0	13.1	ND	ND
4B	07/30/01	8.0	12	0.3	0.9
4B	08/03/01	7.7	13.2	ND	ND
4B	08/06/01	7.9	13.2	ND	0.8
4B	08/13/01	8.2	13.1	ND	ND
4B	08/21/01	7.4	12.9	ND	1.0
5A	04/03/00	6.6	7.0	ND	0.0
5A	03/08/01			0.3	0.7
6A	04/04/00	5.5	7.0	ND	ND
6A	06/06/00	7.2	9.0	ND	ND
6A	06/14/00	7.4	10.8	ND	0.3
6A	06/19/00	7.1	10.2	ND	0.3
6A	06/26/00	5.4	9.8	0.3	0.5
6A	07/05/00	NA	10.3	ND	0.2
6A	07/07/00	NA	NA	0.3	0.4
6A	07/10/00	NA	11.4	0.3	0.5
6A	07/18/00	7.8	11.1	0.4	0.4
6A	07/24/00	7.5	11.8	ND	0.2

Note: ND = no detections above the limit of quantitation of 0.2 ug/L

Table B-3. Assert reults and field parameters for flood- and sprinkler- test plot wells.

Sample Location	Date Sampled	Field pH	Field Temp. C	Assert (ug/L)	Assert-Met (ug/L)
6A	03/07/01			ND	0.2
6A	05/16/01			ND	ND
6A	05/23/01	7.5	8.2	ND	ND
6A	05/28/01			ND	ND
6A	06/02/01			ND	ND
6A	06/04/01	7.6	8.3	ND	ND
6A	06/12/01	7.7	8.1	ND	ND
6A	06/18/01	7.5	8.9	ND	ND
6A	06/20/01	7.6	10.1	ND	ND
6A	06/22/01	7.5	9.6	ND	ND
6A	06/25/01	7.5	12.5	ND	ND
6A	06/26/01			ND	ND
6A	06/27/01			ND	ND
6A	06/28/01			ND	ND
6A	06/29/01			ND	ND
6A	06/30/01			ND	ND
6A	07/02/01	7.6	11.7	ND	ND
6A	07/05/01	8.0	10.2	ND	ND
6A	07/09/01	8.2	11.4	ND	ND
6A	07/16/01	8.2	10.5	ND	ND
6A	07/23/01	8.2	11.7	ND	ND
6A	07/30/01	8.2	11.3	ND	ND
6A	08/03/01	7.9	12	ND	ND
6A	08/06/01	8.0	12.4	ND	ND
6A	08/13/01	8.4	12	ND	ND
6A	08/21/01	7.6	12.1	ND	ND
6B	06/06/00	7.2	10.1	0.2	0.6
6B	06/14/00	7.3	10.9	ND	0.2
6B	06/19/00	6.8	11.7	0.2	0.5
6B	06/26/00	7.7	11.0	0.9	1.0
6B	07/05/00	NA	11.6	ND	ND
6B	07/07/00	NA	NA	0.6	0.7
6B	07/10/00	NA	12.2	0.7	1.0
6B	07/18/00	7.8	12.9	5.2	3.5
6B	07/24/00	7.6	13.2	ND	0.2
6B	03/07/01			ND	ND
6B	05/16/01			ND	ND
6B	05/23/01	7.6	10.2	ND	0.4
6B	05/28/01			ND	ND
6B	06/02/01			ND	ND
6B	06/04/01	7.7	8.5	ND	0.3
6B	06/12/01	7.8	8.2	ND	ND
6B	06/18/01	7.8	9.9	ND	ND
6B	06/20/01	7.8	10.3	ND	ND
6B	06/22/01	7.8	9.6	ND	ND
6B	06/25/01	7.9	12	ND	ND
6B	06/26/01			ND	ND
6B	06/27/01			ND	ND
6B	06/28/01			ND	ND
6B	06/29/01			ND	ND
6B	06/30/01			ND	ND
6B	07/02/01	7.8	12.9	ND	ND
6B	07/05/01	7.9	11.7	ND	ND
6B	07/09/01	8.1	13.4	ND	ND
6B	07/16/01	8.0	12.2	ND	ND
6B	07/23/01	8.2	12.7	ND	ND
6B	07/30/01	8.0	12.1	ND	ND
6B	08/03/01	7.7	13.1	ND	ND

Note: ND = no detections above the limit of quantitation of 0.2 ug/L

Table B-3. Assert reults and field parameters for flood- and sprinkler- test plot wells.

Sample Location	Date Sampled	Field pH	Field Temp. C	Assert (ug/L)	Assert-Met (ug/L)
6B	08/06/01	7.9	13	ND	ND
6B	08/13/01	8.1	13	ND	ND
6B	08/21/01	7.4	13.2	ND	ND
7A	04/04/00	5.4	6.0	ND	ND
7A	05/30/00	7.8	8.0	ND	0.6
7A	06/06/00	7.5	9.0	ND	0.4
7A	06/14/00	NA	NA	ND	0.4
7A	06/18/00	7.0	10.3	ND	0.4
7A	06/21/00	7.6	10.9	ND	0.3
7A	06/26/00	7.4	10.3	ND	0.8
7A	07/05/00	NA	11.1	ND	0.4
7A	07/07/00	NA	NA	ND	0.3
7A	07/10/00	NA	11.4	ND	0.2
7A	07/18/00	7.6	12.0	0.5	1.5
7A	07/24/00	7.4	12.1	0.2	0.6
7A	03/07/01			ND	ND
7A	05/16/01			ND	ND
7A	05/23/01	7.8	8.3	ND	ND
7A	05/28/01			ND	ND
7A	06/02/01			ND	ND
7A	06/04/01	7.6	8.4	ND	ND
7A	06/12/01	7.6	8.5	ND	ND
7A	06/18/01	7.4	9.1	ND	ND
7A	06/20/01	7.6	10	ND	ND
7A	06/22/01	7.7	10.5	ND	ND
7A	06/25/01	7.9	12.5	ND	ND
7A	06/26/01			ND	ND
7A	06/27/01			ND	ND
7A	06/28/01			ND	ND
7A	06/29/01			ND	ND
7A	06/30/01			ND	ND
7A	07/02/01	7.6	12.1	ND	0.2
7A	07/05/01	8.0	10.4	ND	ND
7A	07/09/01	8.3	12	ND	ND
7A	07/16/01	8.4	11.3	ND	ND
7A	07/23/01	8.2	12.2	ND	ND
7A	07/30/01	8.2	11.6	ND	ND
7A	08/03/01	8.0	13	ND	ND
7A	08/06/01	8.1	12.5	ND	ND
7A	08/13/01	8.3	12.4	ND	ND
7A	08/21/01	7.7	12	ND	ND
7B	06/06/00	7.6	9.5	ND	0.6
7B	06/14/00	7.6	10.7	ND	0.3
7B	06/21/00	7.6	11.4	ND	0.3
7B	06/26/00	7.6	10.2	ND	0.8
7B	07/05/00	NA	10.9	ND	0.5
7B	07/07/00	NA	NA	ND	0.5
7B	07/10/00	NA	10.9	0.2	0.4
7B	07/18/00	7.8	11.4	0.5	1.8
7B	07/24/00	7.6	12.0	0.3	0.9
7B	03/07/01			ND	ND
7B	05/16/01			ND	ND
7B	05/23/01	7.8	8.7 / 8.2	ND	ND
7B	05/28/01			ND	ND
7B	06/02/01			ND	ND
7B	06/04/01	7.7	8.7 / 8.1	ND	ND
7B	06/12/01	7.9	8.7 / 8.5	ND	ND
7B	06/18/01	7.7	10.3/9.2	ND	ND

Note: ND = no detections above the limit of quantitation of 0.2 ug/L

Table B-3. Assert reults and field parameters for flood- and sprinkler- test plot wells.

Sample Location	Date Sampled	Field pH	Field Temp. C	Assert (ug/L)	Assert-Met (ug/L)
7B	06/20/01	7.8	10.2/9.6	ND	ND
7B	06/22/01	7.9	10.0/10.0	ND	ND
7B	06/25/01	7.7	14.2/13.2	ND	ND
7B	06/26/01			ND	ND
7B	06/27/01			ND	ND
7B	06/28/01			ND	ND
7B	06/29/01			ND	ND
7B	06/30/01			ND	ND
7B	07/02/01	7.8	12.0/11.8	ND	ND
7B	07/05/01	8.0	11.4/10.4	ND	ND
7B	07/09/01	8.1	12.8/11.9	ND	ND
7B	07/16/01	8.1	11.7/11.2	ND	ND
7B	07/23/01	8.1	12.4/12.0	ND	ND
7B	07/30/01	8.0	11.8/11.7	ND	ND
7B	08/03/01	7.8	13.9/12.6	ND	ND
7B	08/06/01	7.9	13.5/12.7	ND	ND
7B	08/13/01	8.2	13.4/12.0	ND	ND
7B	08/21/01	7.4	13.4/12.6	ND	ND
8A	04/04/00	NA	NA	ND	0.2
8A	06/07/00	7.2	9.2	ND	0.2
8A	06/14/00	6.9	9.5	ND	0.2
8A	06/19/00	7.3	8.8	ND	ND
8A	06/21/00	7.7	10.2	ND	0.2
8A	06/26/00	7.3	9.3	ND	ND
8A	07/05/00	NA	11.0	ND	ND
8A	07/07/00	NA	NA	ND	0.2
8A	07/10/00	NA	12.1	ND	ND
8A	07/18/00	7.8	12.1	ND	ND
8A	07/24/00	7.5	12.3	ND	ND
8A	03/07/01			ND	ND
8B	06/07/00	7.6	9.9	ND	ND
8B	06/14/00	7.3	11.0	ND	ND
8B	06/19/00	6.9	10.8	ND	ND
8B	06/21/00	7.6	11.0	ND	ND
8B	06/26/00	7.6	10.5	ND	0.3
8B	07/05/00	NA	11.9	ND	ND
8B	07/07/00	NA	NA	ND	ND
8B	07/10/00	NA	11.8	ND	ND
8B	07/18/00	7.9	12.7	ND	ND
8B	07/24/00	7.6	12.9	ND	ND
8B	03/08/01			ND	ND
9A	04/04/00	NA	NA	ND	ND
9A	06/19/00	7.9	10.6	ND	ND
9A	06/21/00	7.2	11.0	ND	ND
9A	07/07/00	NA	NA	ND	ND
9A	03/07/01			ND	ND
9B	06/19/00	6.8	10.6	ND	ND
9B	06/21/00	7.5	11.5	ND	ND
9B	07/07/00	NA	NA	ND	ND
10	04/04/00	NA	NA	ND	ND
10	06/14/00	6.9	9.6	ND	ND
10	03/07/01			ND	ND
11	04/04/00	NA	NA	ND	0.5
11	06/14/00	6.5	11.7	ND	ND
11	06/20/00	NA	NA	0.5	ND
11	07/07/00	NA	NA	ND	ND
11	07/10/00	7.4	11.2	0.2	ND
11	07/18/00	7.3	14.6	ND	ND

Note: ND = no detections above the limit of quantitation of 0.2 ug/L

Table B-3. Assert reults and field parameters for flood- and sprinkler- test plot wells.

Sample Location	Date Sampled	Field pH	Field Temp. C	Assert (ug/L)	Assert-Met (ug/L)
11	07/24/00	7.1	14.6	ND	ND
11	03/08/01			ND	0.4
11	05/16/01			ND	ND
11	05/23/01	7.4	11.5	ND	ND
11	05/28/01			ND	ND
11	06/02/01	7.6	12.5	ND	ND
11	06/04/01	7.6	12.5	ND	ND
11	06/12/01	737.0	10.7	ND	ND
11	06/18/01	7.4	13	ND	ND
11	06/20/01	7.5	12.9	ND	ND
11	06/22/01	7.5	13.2	ND	ND
11	06/25/01	7.5	15.9	ND	ND
11	06/26/01			ND	ND
11	06/27/01			ND	ND
11	06/28/01			ND	ND
11	06/29/01			ND	ND
11	06/30/01			ND	ND
11	07/02/01	7.5	14.5	ND	ND
11	07/05/01	7.7	15.5	ND	ND
11	07/09/01	7.8	15.8	ND	ND
11	07/16/01	8.1	16	ND	ND
11	07/23/01	8.0	15.9	ND	ND
11	07/30/01	8.0	15	ND	ND
11	08/03/01	7.7	17.3	ND	ND
11	08/06/01	7.8	16.9	ND	ND
11	08/13/01			ND	ND
11	08/21/01	7.3	17.2	ND	ND
12	04/04/00	NA	NA	ND	0.5
12	05/30/00	7.1	8.0	ND	0.4
12	06/14/00	7.1	9.0	0.2	0.4
12	07/05/00	NA	10.0	ND	0.4
12	06/20/00	NA	NA	0.2	0.4
12	07/07/00	NA	NA	0.7	1.2
12	07/10/00	NA	10.9	0.5	0.7
12	07/18/00	7.6	11.9	0.4	0.7
12	07/24/00	7.2	12.3	0.3	0.6
12	03/07/01			0.4	0.8
12	05/16/01			ND	ND
12	05/23/01	7.6	8.5	0.2	0.7
12	05/28/01			ND	ND
12	06/02/01			ND	ND
12	06/04/01	7.8	7.9	0.2	0.6
12	06/12/01	7.6	7.4	ND	ND
12	06/18/01	7.7	9.3	0.7	0.3
12	06/20/01	7.5	10.3	ND	ND
12	06/22/01	7.7	9.4	ND	ND
12	06/25/01	7.7	12.2	ND	ND
12	06/26/01			ND	0.6
12	06/27/01			ND	ND
12	06/28/01			ND	ND
12	06/29/01			ND	ND
12	06/30/01			ND	ND
12	07/02/01	7.7	10.4	ND	0.8
12	07/05/01	7.8	12.7	ND	ND
12	07/09/01	8.1	12.5	ND	ND
12	07/16/01	8.0	10.6	0.3	0.8
12	07/23/01	7.9	11.4	ND	ND
12	07/30/01	8.1	10.2	0.5	1.1

Note: ND = no detections above the limit of quantitation of 0.2 ug/L

Table B-3. Assert reults and field parameters for flood- and sprinkler- test plot wells.

Sample Location	Date Sampled	Field pH	Field Temp. C	Assert (ug/L)	Assert-Met (ug/L)
12	08/03/01	7.8	12.1	ND	ND
12	08/06/01	7.9	12.3	0.5	1.1
12	08/13/01			ND	ND
12	08/21/01	7.5	11.8	0.4	1.1
flood tailwater	05/26/00	7.3	20.0	0.4	ND
head ditch	05/26/00	7.8	16.0	ND	ND
bottle rinsate	04/03/00	NA	NA	ND	ND
bottle rinsate	04/04/00	NA	NA	ND	ND

Note: ND = no detections above the limit of quantitation of 0.2 ug/L

Table B-4. Recharge and mass-flux data for the experimental field study.

Year	Well and irrig.method	Recharge, feet	Acreage irrigated by method	Recharge, acft	Recharge rate, acft/day	Metabolite flux, gm	Metabolite flux rate, gm/day	Flux/recharge, gms/ac-ft
2000	1A flood	0.92	38	35	12	0	0	0.0
2000	2A flood	1.16	38	44	15	0	0	0.0
2000	3A flood	1.08	38	41	14	0	0	0.0
2000	4A flood	0.95	38	36	12	18	6	0.5
2000	6A wheel line	0.27	110	30	2.5	11	0.9	0.4
2000	7A wheel line	0.30	110	33	2.4	53	3.8	1.6
2001	1A flood	1.15	8	9.2	3	11	3.6	1.2
2001	2A flood	1.15	8	9.2	3	48	16	5.2
2001	3A flood	1.23	8	9.8	3.3	6	2	0.6
2001	4A flood	0.88	8	7	2	13	4.3	1.9
2001	6A center pivot	0.09	140	12.3	0.7	0	0	0.0
2001	7A center pivot	0.09	140	12.6	0.9	0	0	0.0
2000	1B flood	0.92	38	35	12	0	0	0.0
2000	2B flood	1.03	38	39	13	0	0	0.0
2000	3B flood	1.08	38	41	14	137	46	3.3
2000	4B flood	0.92	38	35	12	17	6	0.5
2000	6B wheel line	0.27	110	30	2.5	123	10	4.1
2000	7B wheel line	0.30	110	33	2.4	55	3.9	1.7
2001	1B flood	1.15	8	9.2	3	6	2	0.7
2001	2B flood	1.15	8	9.2	3	72	24	7.8
2001	3B flood	1.20	8	9.6	3.2	24	8	2.5
2001	4B flood	0.88	8	7	2	16	5	2.3
2001	6B center pivot	0.09	140	12.3	0.7	0	0	0.0
2001	7B center pivot	0.11	140	15.4	0.9	0	0	0.0
Avg shallow flood		**1.04**		**23.13**	**7.78**	**34.00**	**11.38**	**2.14**
2000 Avg shallow flood		0.99		37.50	12.75	38.50	13.00	0.96
2001 Avg shallow flood		1.09		8.75	2.80	29.50	9.75	3.32
Avg shallow sprinkler		**0.19**		**22.68**	**1.63**	**44.50**	**3.48**	**1.44**
2000 Avg shallow spr.		0.29		31.50	2.45	89.00	6.95	2.88
2001 Avg shallow spr.		0.10		13.85	0.80	0.00	0.00	0.00
Avg. deep flood		**1.06**		**23.90**	**8.04**	**12.00**	**3.99**	**1.17**
2000 Avg. deep flood		1.03		39.00	13.25	4.50	1.50	0.13
2001 Avg. deep flood		1.10		8.80	2.83	19.50	6.48	2.22
Avg deep sprinkler		**0.19**		**21.98**	**1.63**	**16.00**	**1.18**	**0.49**
2000 Avg deep sprinkler		0.29		31.50	2.45	32.00	2.35	0.99
2001Avg deep sprinkler		0.09		12.45	0.80	0.00	0.00	0.00
Avg. all flood both years								**1.70**
Avg. all spr. both years								**1.00**
2000 Avg flood		1.01		38.25	13.00	21.50	7.25	0.54
2001 Avg flood		1.10		8.78	2.81	24.50	8.11	2.77
2000 Avg wheel line		0.29		31.50	2.45	60.50	4.65	1.93
2001 Avg center pivot		0.09		13.15	0.80	0.00	0.00	0.00
Avg. flux/rech, (gms/ac-ft)	*Year*			*Deep flood*	*Shallow flood*	*Deep sprinkle*	*Shallow sprinkle*	
	2000			0.96	0.13	2.88	0.99	
	2001			3.32	2.22	0.00	0.00	

Table B-5. Year 2000 Bromide ion tracer-test data for the flood- and sprinkler-plots.

		2000 Flood plot well data - tracer test																	
	200ppb MV	1A		1B		2A		2B		3A		3B		4A		4B		5A	
Date Time	reading	MV	delta MV	MV	delta MV	MV	delta MV	MV	delta MV	MV	delta MV	MV	delta MV	MV	delta MV	MV	delta MV	MV	delta MV
6/22/2000 12:00	-22																	5.7	-27.7
6/22/2000 16:30	-18																		
6/23/2000 9:00	-14																	10.5	-24.5
6/23/2000 15:00	-14	27.1	-41.1	24.8	-38.8	21.6	-35.6	9.1	-23.1	21.6	-35.6	21	-35	10.1	-24.1	5.5	-19.5	17.4	-31.4
6/24/2000 10:00	-22	11.6	-33.6	17.3	-39.3	2.7	-24.7	6.8	-28.8	21.6	-43.6	16.1	-38.1	6.5	-28.5	3.6	-25.6	13.8	-35.8
6/24/2000 15:00	-22	19	-41	22.1	-44.1	11.5	-33.5	6.5	-28.5	24.7	-46.7	20	-42	6.8	-28.8	3.1	-25.1	14	-36
6/25/2000 10:00	-20	12.2	-32.2	14.2	-34.2	8.6	-28.6	5.1	-25.1	16.9	-36.9	14.1	-34.1	4.1	-24.1	3	-23	11.2	-31.2
6/25/2000 13:30	-23	13.1	-36.1	16.8	-39.8	7	-30	4.4	-27.4	16.4	-39.4	15.4	-38.4	5.1	-28.1	2.8	-25.8	10.1	-33.1
6/26/2000 12:00	-19	13.9	-32.9	13.6	-32.6	7.2	-26.2	4.4	-23.4	16.8	-35.8	10.4	-29.4	3.7	-22.7	1.7	-20.7	10.5	-29.5
6/27/2000 13:30	0	19.8	-19.8	21.8	-21.8	11.2	-11.2	11.2	-11.2	19	-19	11.3	-11.3	8.5	-8.5	1.2	-1.2	12.5	-12.5
6/28/2000 12:00	2	18.5	-16.5	18.5	-16.5	10.6	-8.6	11.4	-9.4	13.6	-11.6	11.3	-9.3	8.1	-6.1	1.6	0.4	12.9	-10.9
6/29/2000 10:30	5	21.2	-16.2	22.5	-17.5	19.5	-14.5	17.2	-12.2	15.9	-10.9	20.4	-15.4	21	-16	12.9	-7.9	18	-13
7/4/2000 11:00	-10.5	8.5	-19	11.1	-21.6			5.2	-15.7	9	-19.5	11.1	-21.6	1.5	-12	-2.5	-8	7	-17.5
7/5/2000 7:00	-5	10.3	-15.3	-9	4	-9.5	4.5	3.6	-8.6	9.7	-14.7	8.2	-13.2	-3.2	-1.8	3.1	-8.1	6.5	-11.5
7/5/2000 12:00	-1	13.4	-14.4	17.4	-18.4	5.6	-6.6	10.3	-11.3	14.7	-15.7	9.2	-10.2	9.3	-10.3	4.8	-5.8	3.5	-4.5
7/5/2000 18:00	-2	18.4	-20.4	21.2	-23.2	8.1	-10.1	15.1	-17.1									12.7	-14.7
7/5/2000 22:00	3	19.9	-16.9	19.1	-16.1	9.9	-6.9	6.6	-3.6									10.6	-7.6
7/6/2000 2:00	0.2	17.6	-17.4	19	-18.8	9.5	-9.3	5.1	-4.9									9.7	-9.5
7/6/2000 6:00	-2.8	12	-14.8	17.8	-20.6	10.5	-13.3	4.5	-7.3									9	-11.8
7/6/2000 10:00	-1.1	21.2	-22.3	19.7	-20.8	10.3	-11.4	4.2	-5.3									11.3	-12.4
7/6/2000 14:00	3.6	21.1	-17.5	17.8	-14.2	10.4	-6.8	5.7	-2.1									12.5	-8.9
7/6/2000 18:00	1.7	21.7	-20	22.1	-20.4	10.8	-9.1	4.2	-2.5									10.6	-8.9
7/6/2000 22:00	2.2	17.9	-15.7	19.8	-17.6	10.8	-8.6	3.7	-1.5									9.8	-7.6
7/7/2000 2:00	0	19.6	-19.6	19	-19	9.7	-9.7	1.9	-1.9									6.9	-6.9
7/7/2000 6:00	-3.4	19.7	-23.1	20	-23.4	9.1	-12.5	2.7	-6.1									7.1	-10.5
7/7/2000 10:00	0.9	24	-23.1	21.8	-20.9	9.6	-8.7	4.8	-3.9									11.1	-10.2
7/7/2000 14:00	-6.5	19.5	-26	19.5	-26	10.9	-17.4	6.5	-13									14.7	-21.2
7/7/2000 19:00	-1	14.2	-15.2	14.7	-15.7	11.6	-12.6	3.1	-4.1									9.7	-10.7
7/7/2000 22:00	-2	22.2	-24.2	19.4	-21.4	10.4	-12.4	3.9	-5.9									9.4	-11.4
7/8/2000 4:00	-3	21.4	-24.4	22.7	-25.7	8.6	-11.6	3	-6									9.2	-12.2
7/8/2000 10:00	-4	9.9	-13.9	16.6	-20.6	2.2	-6.2	-3.1	-0.9	10.5	-14.5	5.7	-9.7	0	-4	-0.1	-3.9	6.5	-10.5
7/8/2000 15:00	-4	21.2	-25.2	22	-26	7.5	-11.5	2.8	-6.8	15.6	-19.6	5.5	-9.5	5.7	-9.7	3.5	-7.5	11	-15
7/8/2000 23:00	-5	23.4	-28.4	24.1	-29.1	8	-13	6.7	-11.7	16.1	-21.1	7.1	-12.1	10.3	-15.3	9.2	-14.2	9.1	-14.1
7/9/2000 9:00	-6	22.9	-28.9	24.7	-30.7	12.7	-18.7	11.2	-17.2	16.7	-22.7	7.2	-13.2	6.8	-12.8	5.8	-11.8	13.7	-19.7

Note: Bromide ion measured with a bromide ion-specific electrode.
Bromide ion concentrations reported as millivolts, MV

Table B-5. Year 2000 Bromide ion tracer-test data for the flood- and sprinkler-plots.

	2000 Sprinkler plot well data - tracer test																	
	6A		6B		7A		7B		8A		8B		9A		9B		10A	
Date Time	MV	delta MV	MV	delta MV	MV	delta MV	MV	delta MV	MV	delta MV	MV	delta MV	MV	delta MV	MV	delta MV	MV	delta MV
6/22/2000 12:00	9	-31	1	-23	5.7	-27.7	10	-32	14	-36			9	-31	14	-36		
6/22/2000 16:30	5.2	-23.2	-17.5	-0.5	3.7	-21.7	6	-24										
6/23/2000 9:00	12.5	-26.5	-46	32	4	-18	5.6	-19.6	12.1	-26.1	13	-27	12.3	-26.3	14.5	-28.5	13.8	-27.8
6/23/2000 15:00	15.8	-29.8	-50.6	36.6	5.4	-19.4	1.9	-15.9	8.8	-22.8	8.2	-22.2	16.5	-30.5	18.3	-32.3	18.5	-32.5
6/24/2000 10:00	13.2	-35.2	-105.5	83.5	4.4	-26.4	8.6	-30.6	18.3	-40.3	14	-36	23	-45	22.3	-44.3	21.3	-43.3
6/24/2000 15:00	1.3	-23.3	-104.4	82.4	3.3	-25.3	7.8	-29.8	15.9	-37.9	10.6	-32.6	20.4	-42.4	19.8	-41.8	14.3	-36.3
6/25/2000 10:00	8.1	-28.1	-96.2	76.2	3.7	-23.7	5.4	-25.4	12	-32	8.2	-28.2	16	-36	14.8	-34.8	17	-37
6/25/2000 13:30	8.4	-31.4	-80.9	57.9	3.1	-26.1	5.1	-28.1	15.3	-38.3	10.6	-33.6	17.8	-40.8	18.5	-41.5	19.5	-42.5
6/26/2000 12:00	7.5	-26.5	-78.5	59.5	5.7	-24.7	6.9	-25.9	8.2	-27.2	8.2	-27.2	20.1	-39.1	19.5	-38.5	20.2	-39.2
6/27/2000 13:30	0.2	-0.2	-61.5	61.5	5	-5	5.4	-5.4	7.7	-7.7	7.8	-7.8	10.6	-10.6	12.2	-12.2	14.6	-14.6
6/28/2000 12:00	1.4	0.6	-44.1	46.1	6.1	-4.1	6.3	-4.3	12.7	-10.7	11	-9	15.1	-13.1	15.6	-13.6	19.2	-17.2
6/29/2000 10:30	10.2	-5.2	-12.9	17.9	11.9	-6.9	12.3	-7.3	17.1	-12.1	17	-12	20.5	-15.5	16	-11	11.3	-6.3
7/4/2000 11:00	5	-15.5	-4.8	-5.7	-4	-6.5	1.5	-12	6.3	-16.8	5.9	-16.4	9.6	-20.1	9.1	-19.6	11.8	-22.3
7/5/2000 7:00																		
7/5/2000 12:00																		
7/5/2000 18:00																		
7/5/2000 22:00																		
7/6/2000 2:00																		
7/6/2000 6:00																		
7/6/2000 10:00																		
7/6/2000 14:00																		
7/6/2000 18:00																		
7/6/2000 22:00																		
7/7/2000 2:00																		
7/7/2000 6:00																		
7/7/2000 10:00																		
7/7/2000 14:00																		
7/7/2000 19:00																		
7/7/2000 22:00																		
7/8/2000 4:00																		
7/8/2000 10:00	2.2	-6.2	-50.7	46.7	4.8	-8.8	3.6	-7.6	4.5	-8.5	6	-10	8.2	-12.2	8	-12	9.2	-13.2
7/8/2000 15:00																		
7/8/2000 23:00	5.7	-10.7	-28.2	23.2	6.9	-11.9	6.3	-11.3	10.5	-15.5	9.6	-14.6	11.4	-16.4	12.2	-17.2	13.1	-18.1
7/9/2000 9:00	6.4	-12.4	-22.7	16.7	8.2	-14.2	7.6	-13.6	12.1	-18.1	9.9	-15.9	11.2	-17.2	11.7	-17.7	10.7	-16.7

Note: Bromide ion measured with a bromide ion-specific electrode.
Bromide ion concentrations reported as millivolts, MV

Table B-5. Year 2000 Bromide ion tracer-test data for the flood- and sprinkler-plots.

	2000 Upgradient well (11), Downgradient well (12), and drain ditch data - tracer test											
	11A		12A		South Ditch		East Ditch					
Date Time	MV	delta MV	MV	delta MV	MV	delta MV	MV	delta MV				
6/22/2000 12:00			-0.7	-21.3								
6/22/2000 16:30												
6/23/2000 9:00			8.4	-22.4								
6/23/2000 15:00	27.2	-41.2	5.7	-19.7	15.8	-29.8						
6/24/2000 10:00	27.8	-49.8	5.2	-27.2	25.4	-47.4	19.1	-41.1				
6/24/2000 15:00	26.7	-48.7	4	-26	22.9	-44.9	17.3	-39.3				
6/25/2000 10:00			2.3	-22.3	18.6	-38.6	18	-38				
6/25/2000 13:30	24	-47	2.4	-25.4	10	-33	8.7	-31.7				
6/26/2000 12:00	23.5	-42.5	2.7	-21.7	9.7	-28.7	9	-28				
6/27/2000 13:30	23.4	-23.4	21	-21								
6/28/2000 12:00	21.4	-19.4	4.2	-2.2								
6/29/2000 10:30	22.9	-17.9	12.6	-7.6	12.5	-7.5	10.7	-5.7				
7/4/2000 11:00	17	-27.5	-4.1	-6.4	20.8	-31.3						
7/5/2000 7:00												
7/5/2000 12:00												
7/5/2000 18:00												
7/5/2000 22:00												
7/6/2000 2:00												
7/6/2000 6:00												
7/6/2000 10:00												
7/6/2000 14:00												
7/6/2000 18:00												
7/6/2000 22:00												
7/7/2000 2:00												
7/7/2000 6:00												
7/7/2000 10:00												
7/7/2000 14:00												
7/7/2000 19:00												
7/7/2000 22:00												
7/8/2000 4:00												
7/8/2000 10:00	25.6	-29.6	1.5	-5.5								
7/8/2000 15:00												
7/8/2000 23:00												
7/9/2000 9:00												

Note: Bromide ion measured with a bromide ion-specific electrode.
Bromide ion concentrations reported as millivolts, MV

Table B-6. Year 2001 Bromide ion data for the flood-plot tracer test.

WELL	TIME	[Br-]mg/L
1A	6/25/01 10:55 AM	0.135
1A	6/25/01 11:35 AM	0.24
1A	6/25/01 12:12 PM	0.13
1A	6/25/01 5:16 PM	0.97
1A	6/25/01 5:48 PM	0.275
1A	6/25/01 6:37 PM	0.135
1A	6/25/01 7:54 PM	0.145
1A	6/26/01 1:55 AM	0.169
1A	6/26/01 6:17 AM	0.166
1A	6/26/01 8:56 AM	0.143
1A	6/26/01 1:40 PM	0.124
1A	6/26/01 2:16 PM	0.091
1A	6/26/01 3:16 PM	0.103
1A	6/26/01 4:10 PM	0.095
1A	6/26/01 7:00 PM	0.139
1A	6/26/01 9:19 PM	0.055
1A	6/27/01 12:03 AM	0.122
1A	6/27/01 9:18 AM	0.113
1A	6/27/01 1:24 PM	0.824
1A	6/27/01 5:17 PM	0.346
1A	6/27/01 9:25 PM	0.149
1A	6/28/01 11:45 AM	0.247
1B	6/25/01 10:52 AM	0.35
1B	6/25/01 11:32 AM	0.25
1B	6/25/01 12:07 PM	0.285
1B	6/25/01 5:10 PM	0.42
1B	6/25/01 5:23 PM	0.4
1B	6/25/01 5:42 PM	0.315
1B	6/25/01 5:58 PM	0.245
1B	6/25/01 6:25 PM	0.14
1B	6/25/01 6:47 PM	0.17
1B	6/25/01 7:46 PM	0.215
1B	6/25/01 8:25 PM	0.165
1B	6/25/01 9:34 PM	0.165
1B	6/25/01 10:59 PM	0.165
1B	6/26/01 12:13 AM	0.175
1B	6/26/01 1:17 AM	0.145
1B	6/26/01 1:50 AM	0.179
1B	6/26/01 6:10 AM	0.251
1B	6/26/01 8:46 AM	0.259
1B	6/26/01 1:34 PM	0.855
1B	6/26/01 2:10 PM	0.907
1B	6/26/01 3:12 PM	0.915
1B	6/26/01 4:05 PM	1
1B	6/26/01 6:56 PM	1.71
1B	6/26/01 9:15 PM	1.93
1B	6/26/01 11:57 PM	2.87
1B	6/27/01 9:14 AM	11.4
1B	6/27/01 1:20 PM	8.18
1B	6/27/01 5:12 PM	7.48
1B	6/27/01 9:22 PM	6.27
1B	6/28/01 11:37 AM	19.6
2A	6/25/01 11:10 AM	1.5
2A	6/25/01 6:16 PM	0.175
2A	6/25/01 8:15 PM	0.165
2A	6/26/01 1:40 AM	0.28
2A	6/26/01 6:48 AM	0.207
2A	6/26/01 9:17 AM	0.133
2A	6/26/01 9:42 AM	0.14
2A	6/26/01 2:00 PM	0.141

Note: Bromide ion measured with a bromide ion-specific electrode.
Bromide ion concentrations reported as milligrams per liter, mg/L.
Flood event began 6/25/01 5:16 pm

Table B-6. Year 2001 Bromide ion data for the flood-plot tracer test.

2A	6/26/01 3:34 PM	0.154
2A	6/26/01 7:15 PM	0.17
2A	6/26/01 9:35 PM	0.24
2A	6/27/01 12:18 AM	0.307
2A	6/27/01 9:37 AM	0.253
2A	6/27/01 9:38 PM	0.188
2A	6/28/01 11:30 AM	0.31
2B	6/25/01 11:05 AM	0.115
2B	6/25/01 6:10 PM	0.115
2B	6/25/01 8:09 PM	0.17
2B	6/25/01 9:43 PM	0.185
2B	6/25/01 11:07 PM	0.175
2B	6/26/01 12:21 AM	0.205
2B	6/26/01 1:26 AM	0.268
2B	6/26/01 6:42 AM	0.334
2B	6/26/01 9:11 AM	0.32
2B	6/26/01 9:31 AM	0.255
2B	6/26/01 1:57 PM	0.303
2B	6/26/01 3:29 PM	0.349
2B	6/26/01 7:10 PM	0.311
2B	6/26/01 9:29 PM	0.391
2B	6/27/01 12:14 AM	0.374
2B	6/27/01 9:30 AM	0.28
2B	6/27/01 1:37 PM	0.31
2B	6/27/01 5:24 PM	0.292
2B	6/27/01 9:43 PM	0.181
2B	6/28/01 11:25 AM	0.37
3A	6/25/01 11:18 AM	0.55
3A	6/26/01 7:08 AM	0.153
3A	6/26/01 10:09 AM	0.15
3A	6/27/01 10:11 AM	0.174
3A	6/27/01 2:26 PM	0.128
3A	6/28/01 10:45 AM	0.275
3B	6/25/01 11:24 AM	0.11
3B	6/25/01 9:51 PM	0.155
3B	6/26/01 12:30 AM	0.165
3B	6/26/01 7:14 AM	0.139
3B	6/26/01 10:19 AM	0.15
3B	6/27/01 10:20 AM	0.141
3B	6/27/01 2:21 PM	0.145
3B	6/27/01 9:52 PM	0.143
3B	6/28/01 10:40 AM	0.343
4A	6/25/01 3:10 PM	0.515
4A	6/26/01 7:36 AM	0.383
4A	6/27/01 10:03 AM	0.174
4A	6/27/01 2:12 PM	0.255
4A	6/28/01 11:00 AM	0.37
4B	6/25/01 3:15 PM	0.19
4B	6/26/01 7:30 AM	0.217
4B	6/26/01 3:56 PM	0.153
4B	6/27/01 9:58 AM	0.14
4B	6/27/01 2:05 PM	0.24
4B	6/27/01 10:01 PM	0.141
4B	6/28/01 10:55 AM	0.352
5A	6/25/01 3:00 PM	3
5A	6/25/01 7:00 PM	0.32
5A	6/26/01 9:56 AM	0.235
5A	6/26/01 3:47 PM	0.139
5A	6/27/01 9:50 AM	0.14
5A	6/28/01 11:08 AM	0.24

Note: Bromide ion measured with a bromide ion-specific electrode.
Bromide ion concentrations reported as milligrams per liter, mg/L.
Flood event began 6/25/01 5:16 pm

Appendix B: Figures B-1 through B-26

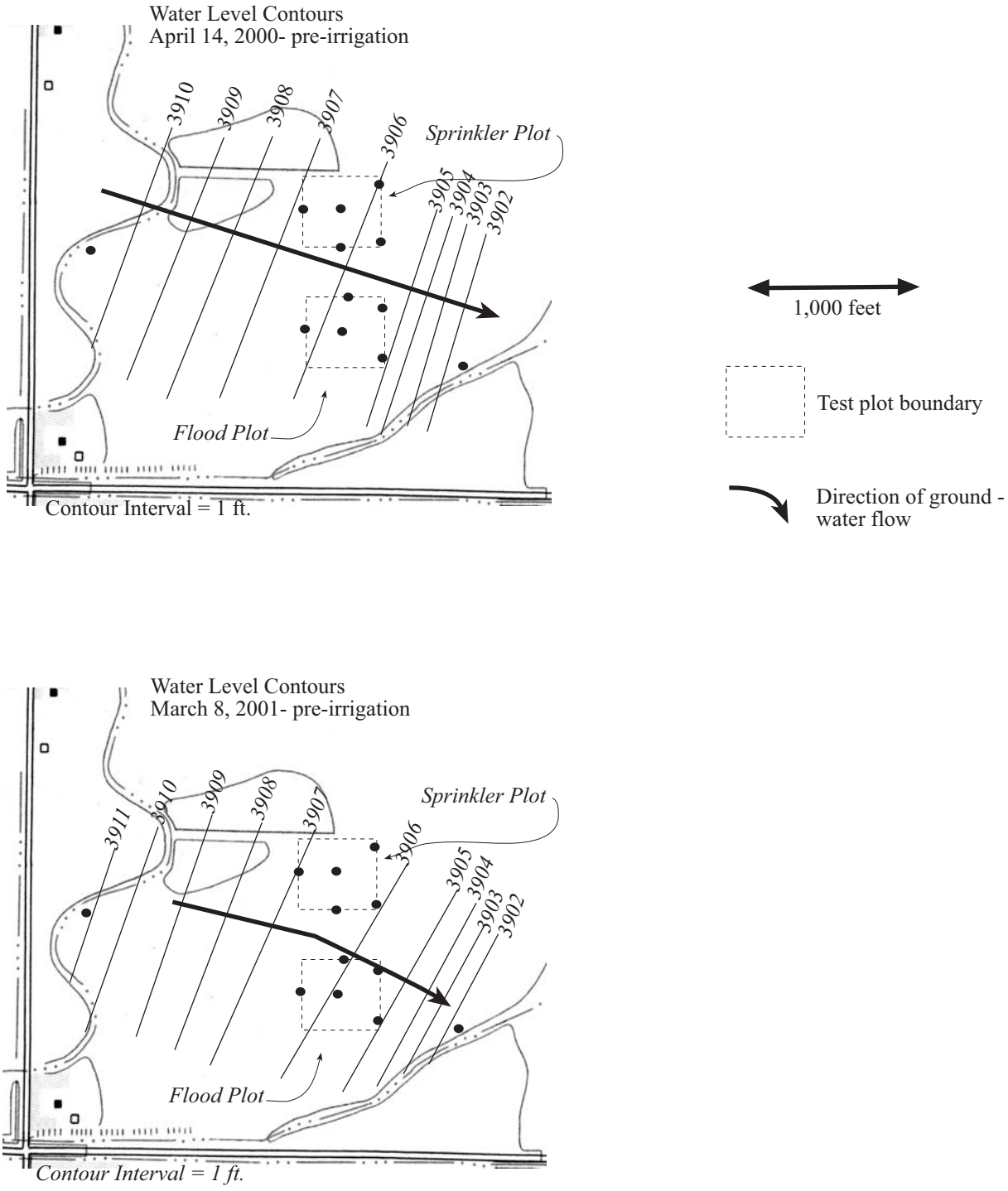

Figure B-1. Water-level contour maps for 4/14/00 and 3/8/01.

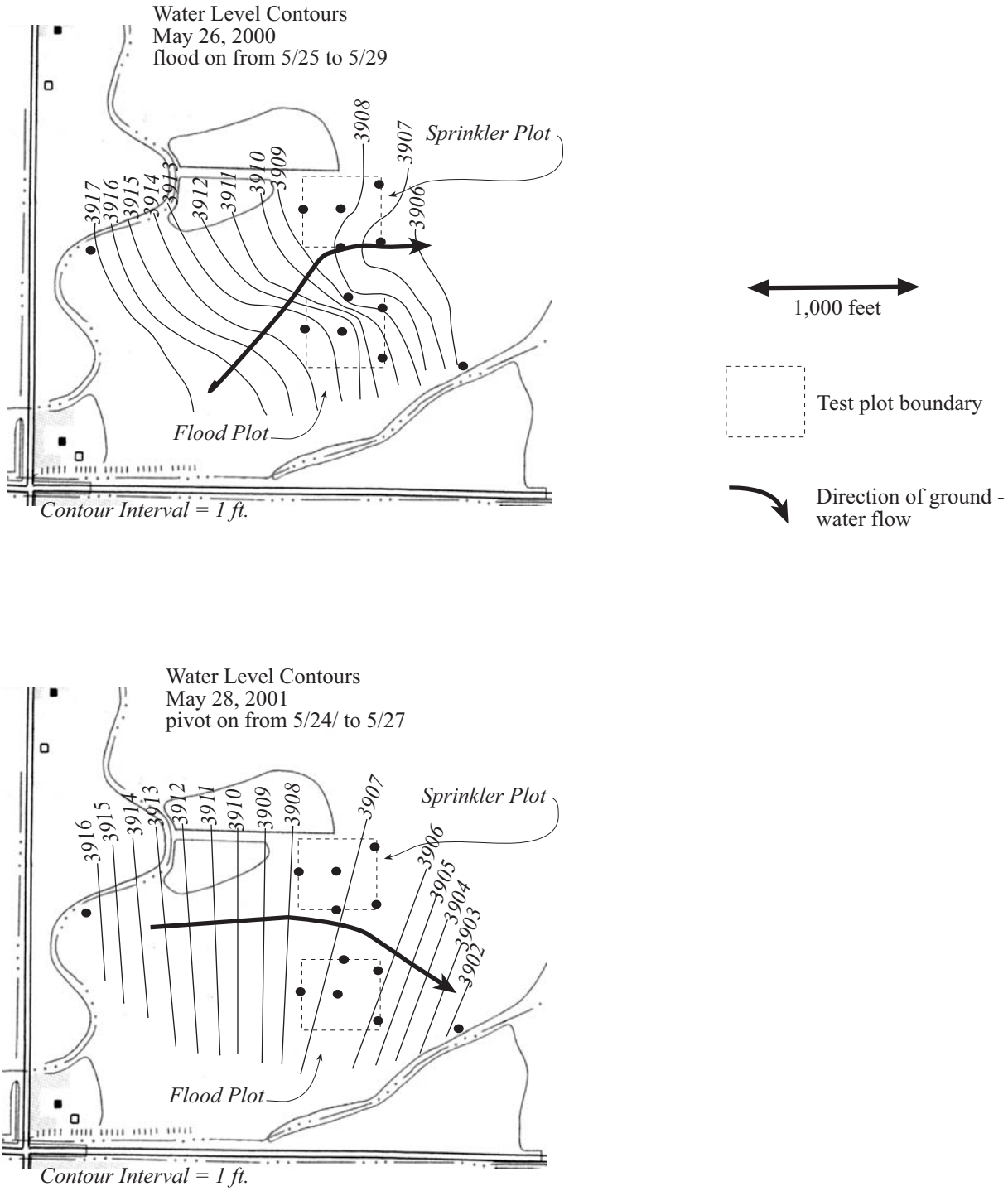

Figure B-2. Water-level contour maps for 5/26/00 and 5/28/01.

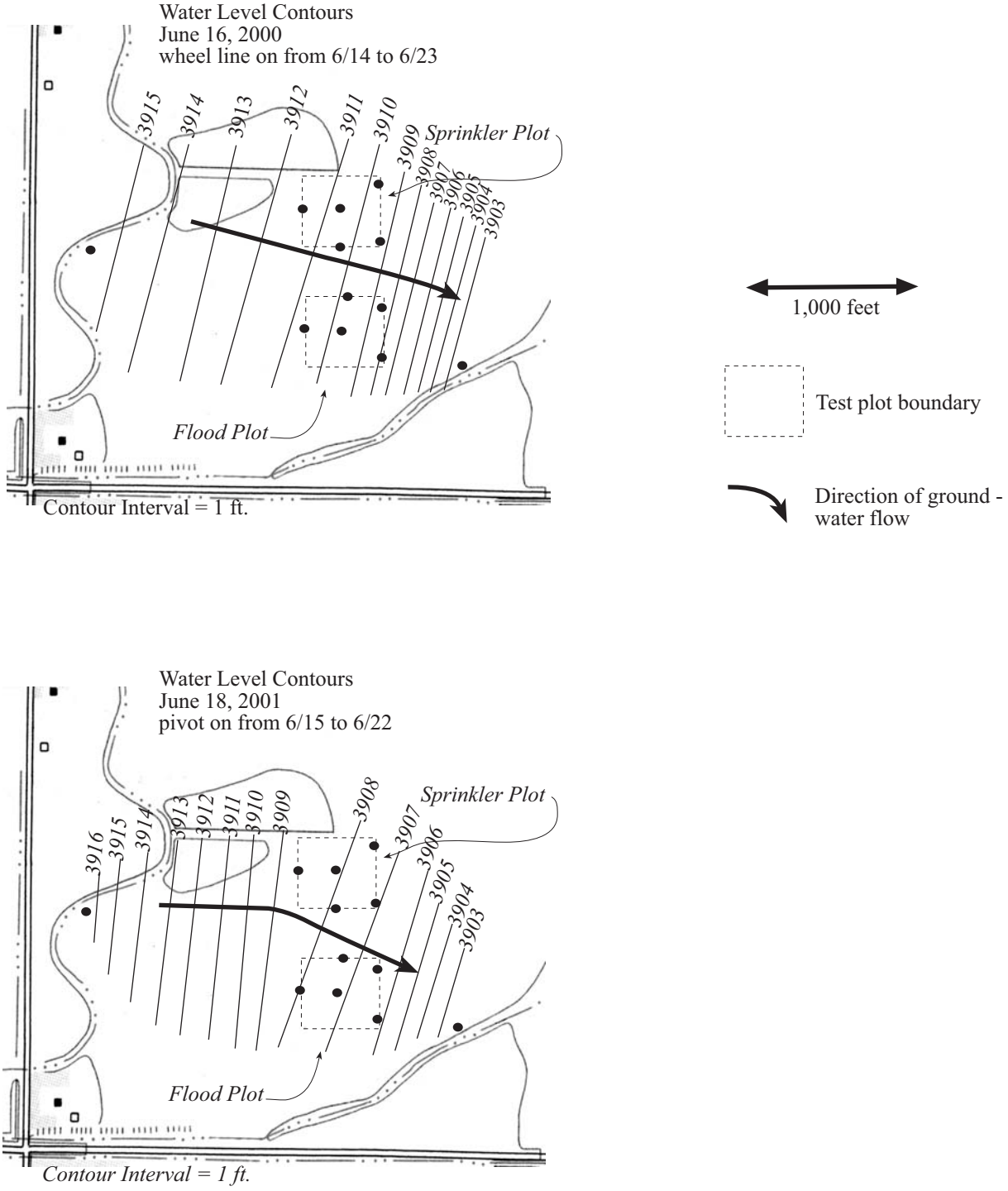

Figure B-3. Water-level contour maps for 6/16/00 and 6/18/01.

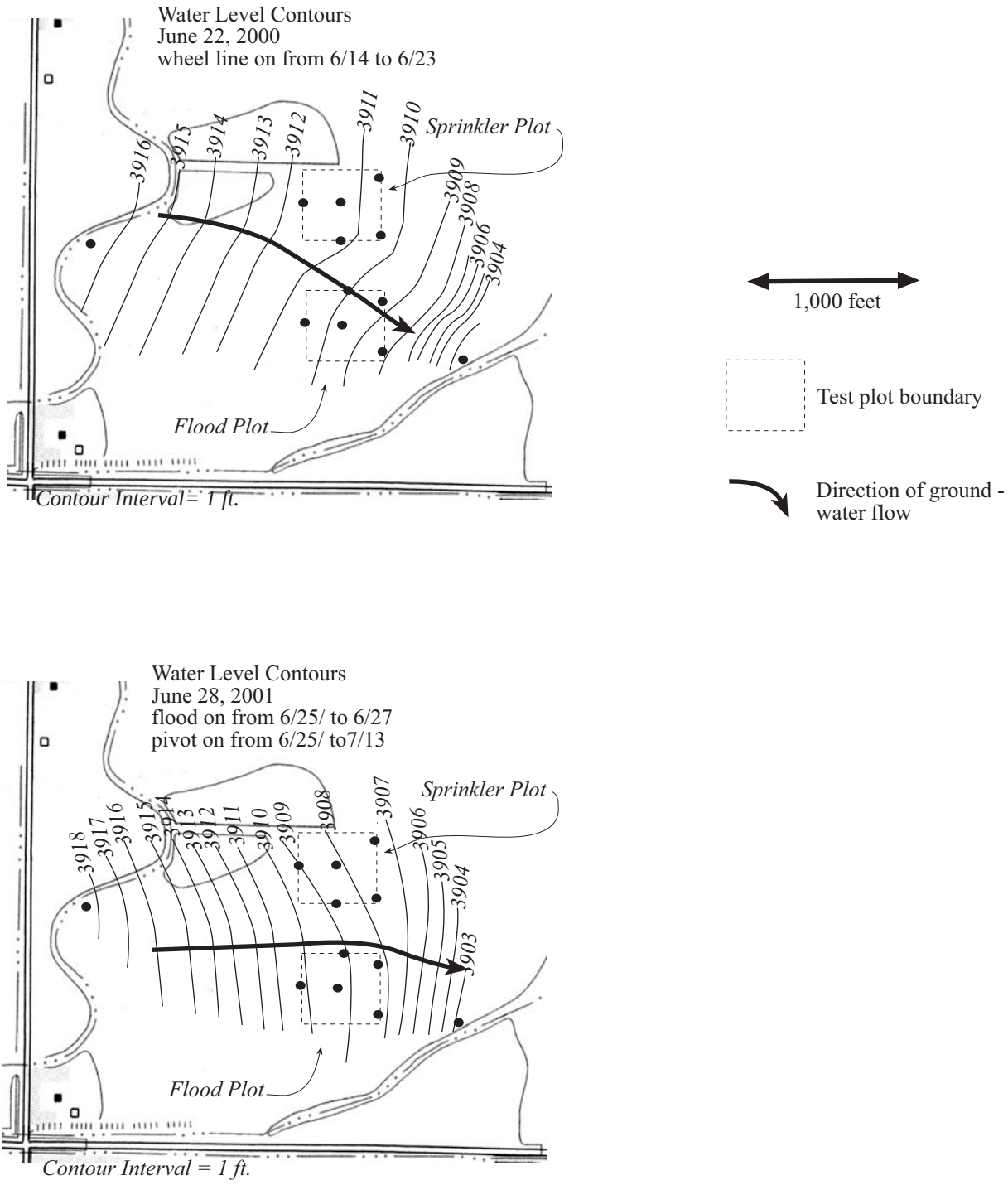

Figure B-4. Water-level contour maps for 6/22/00 and 6/28/01.

Figure B-5. Water-level contour maps for 7/5/00 and 7/23/01.

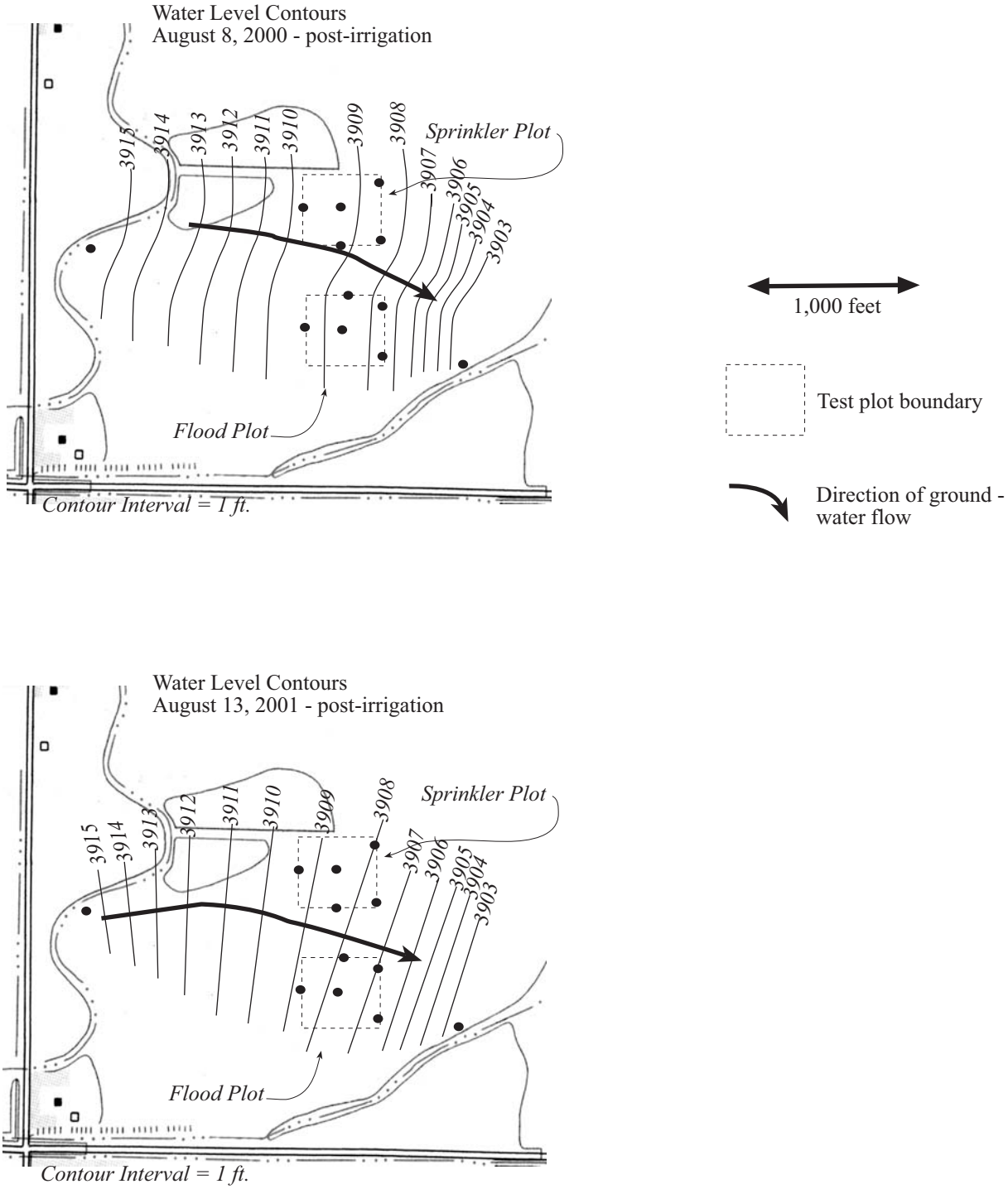

Figure B-6. Water-level contour maps for 8/8/00 and 8/13/01.

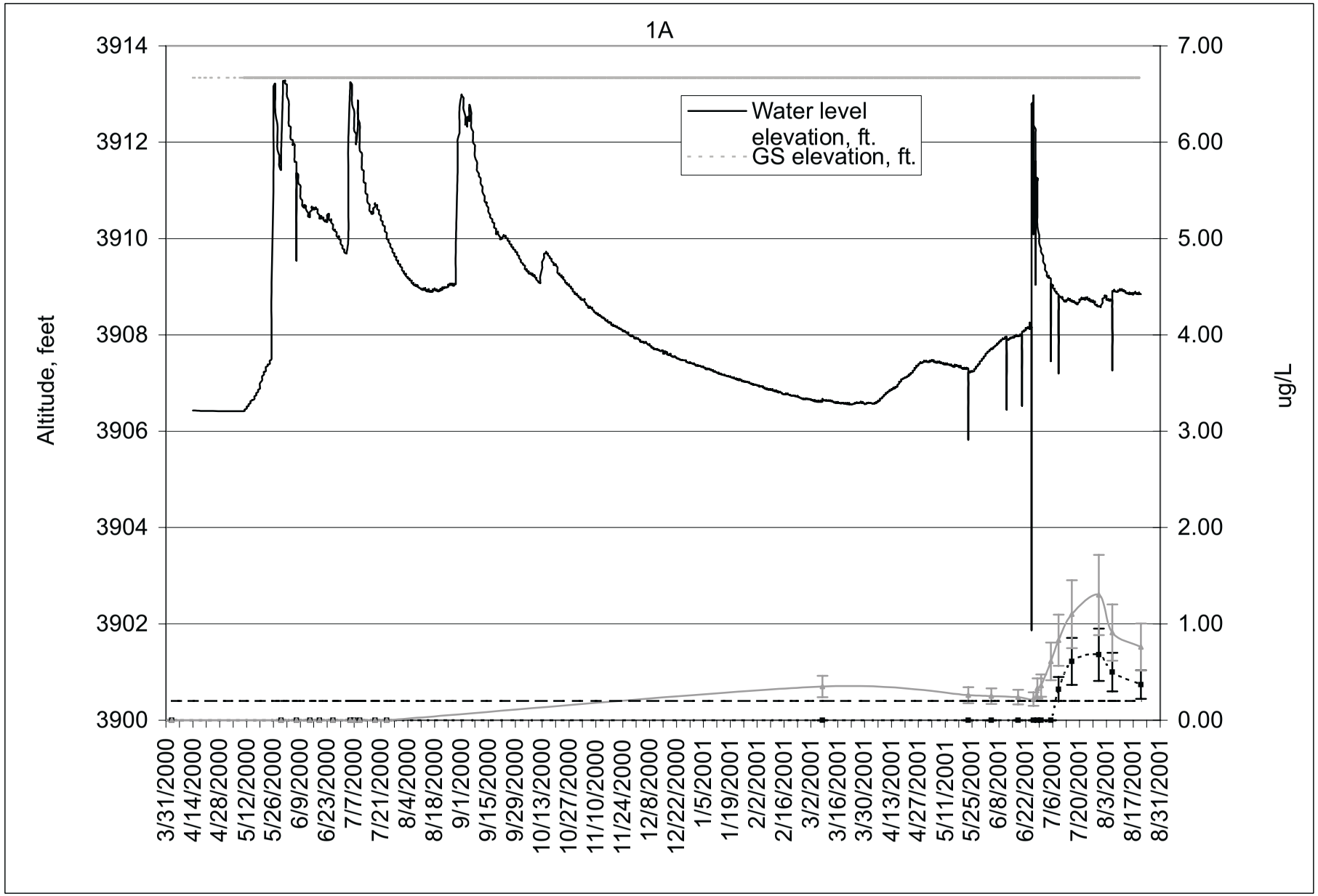

Figure B-7. Hydrograph for well 1A showing Assert and Assert metobolite concentrations

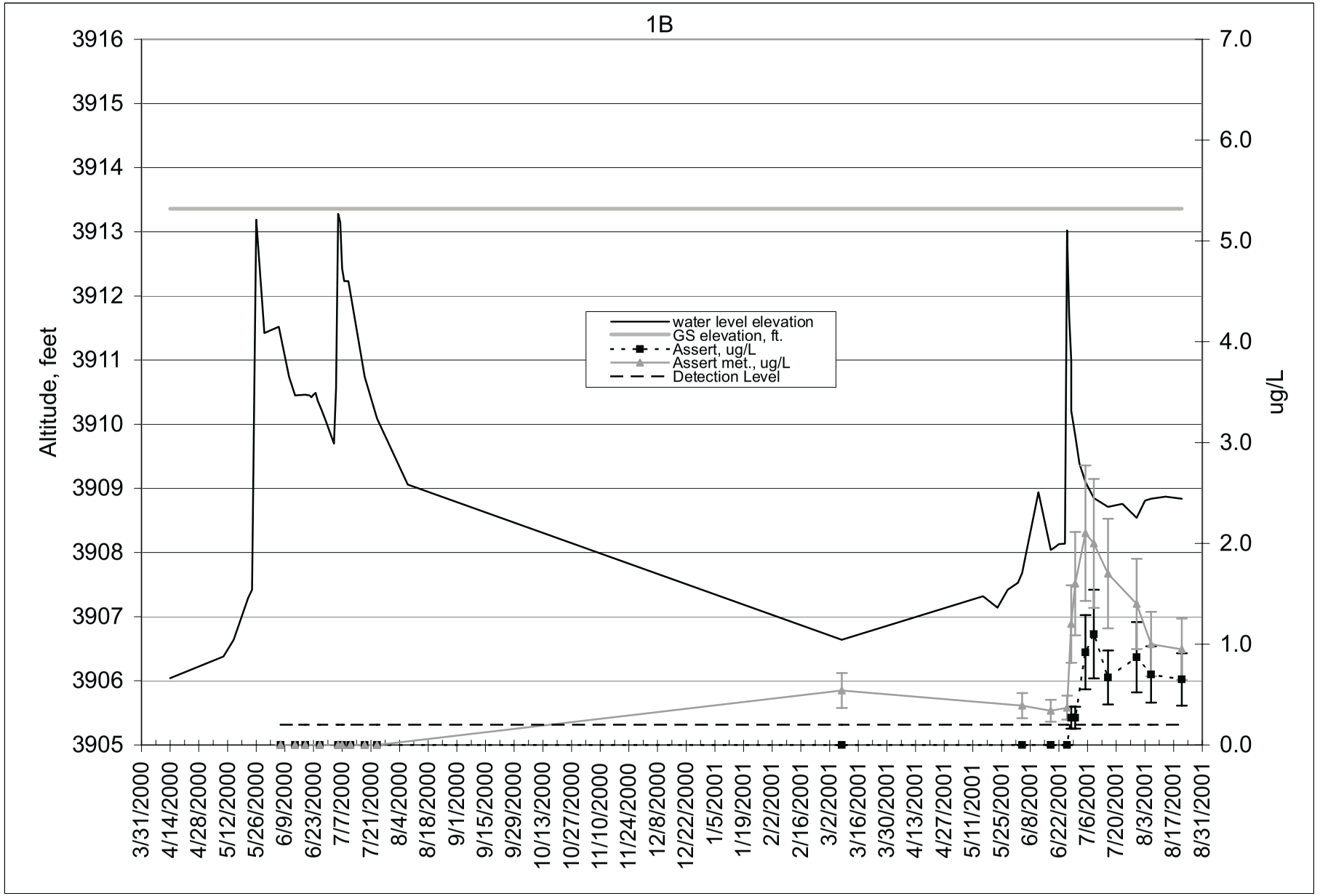

Figure B-8. Hydrograph for well 1B showing Assert and Assert metabolite concentrations.

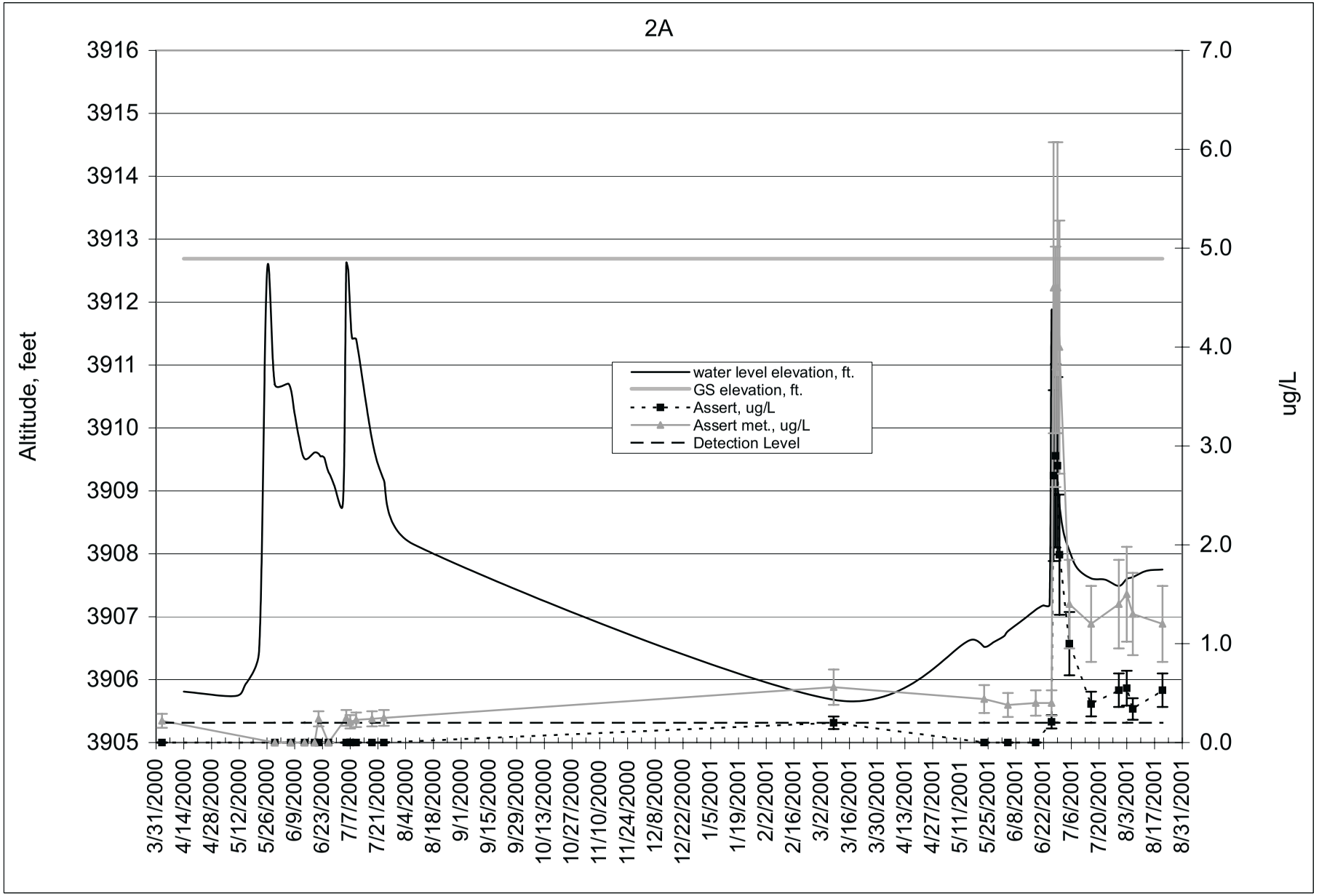

Figure B-10. Hydrograph for well 2A showing Assert and Assert metabolite concentrations.

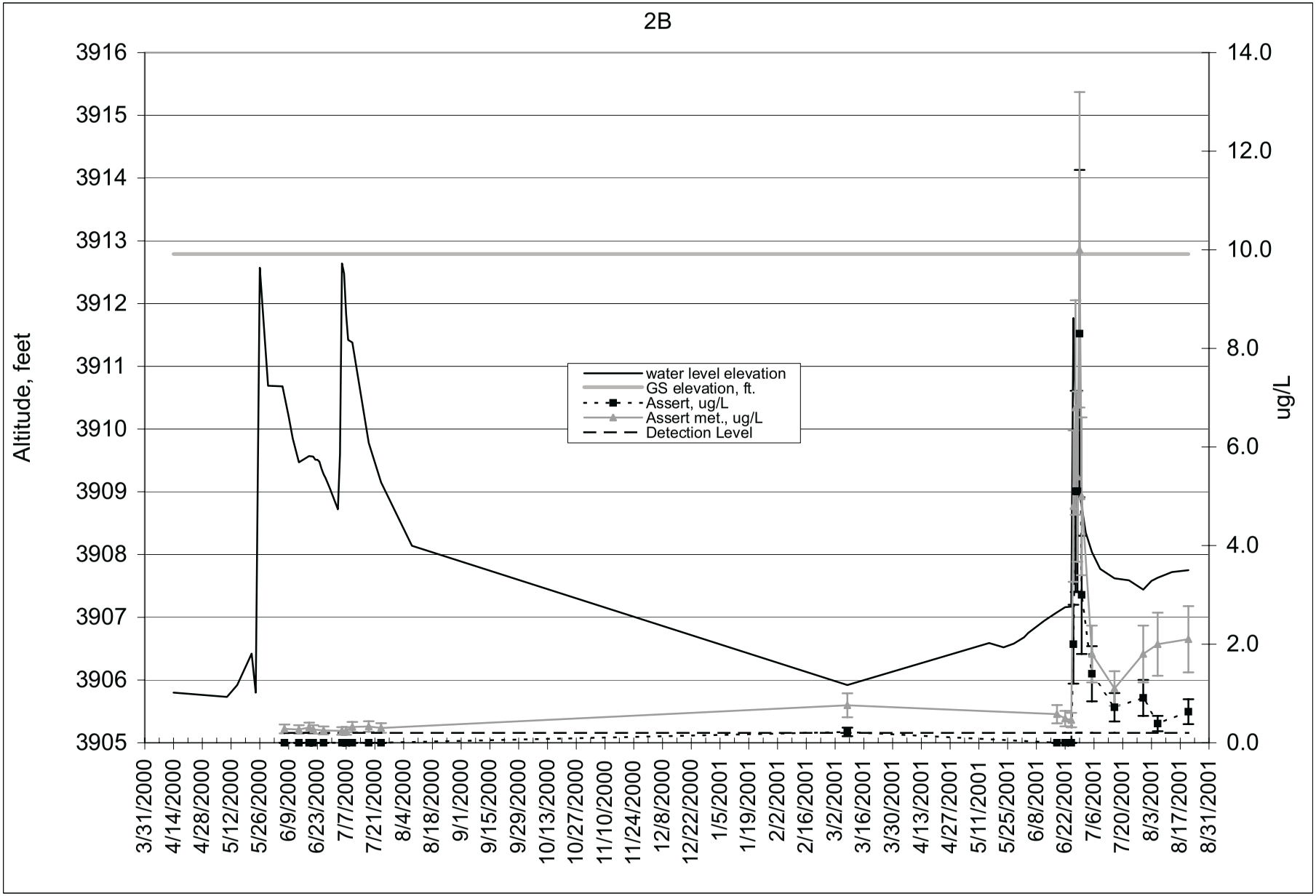

Figure B-11. Hydrograph for well 2B showing Assert and Assert metabolite concentrations.

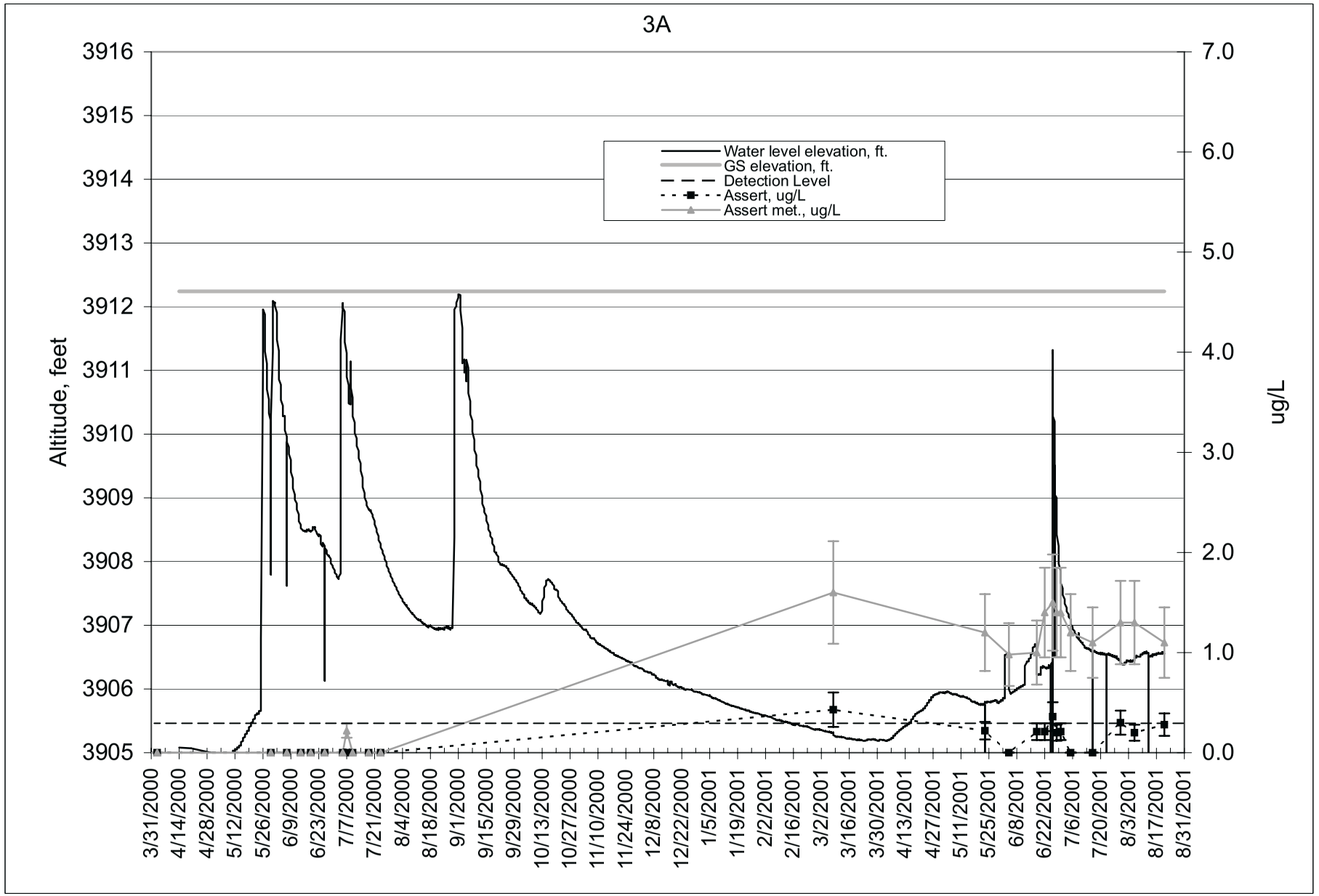

Figure B-12. Hydrograph for well 3A showing Assert and Assert metabolite concentrations.

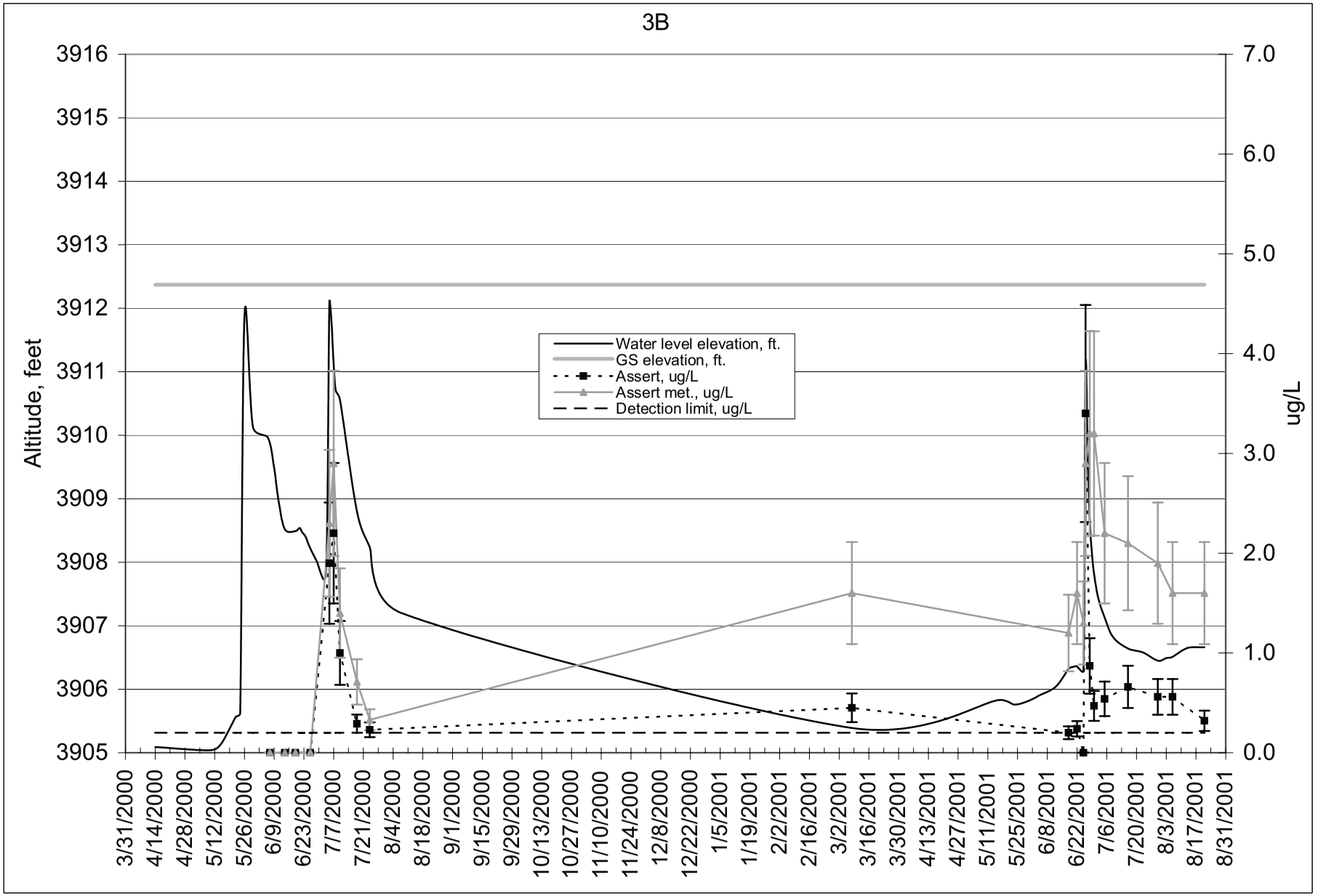

Figure B-12. Hydrograph for well 3B showing Assert and Assert metabolite concentrations.

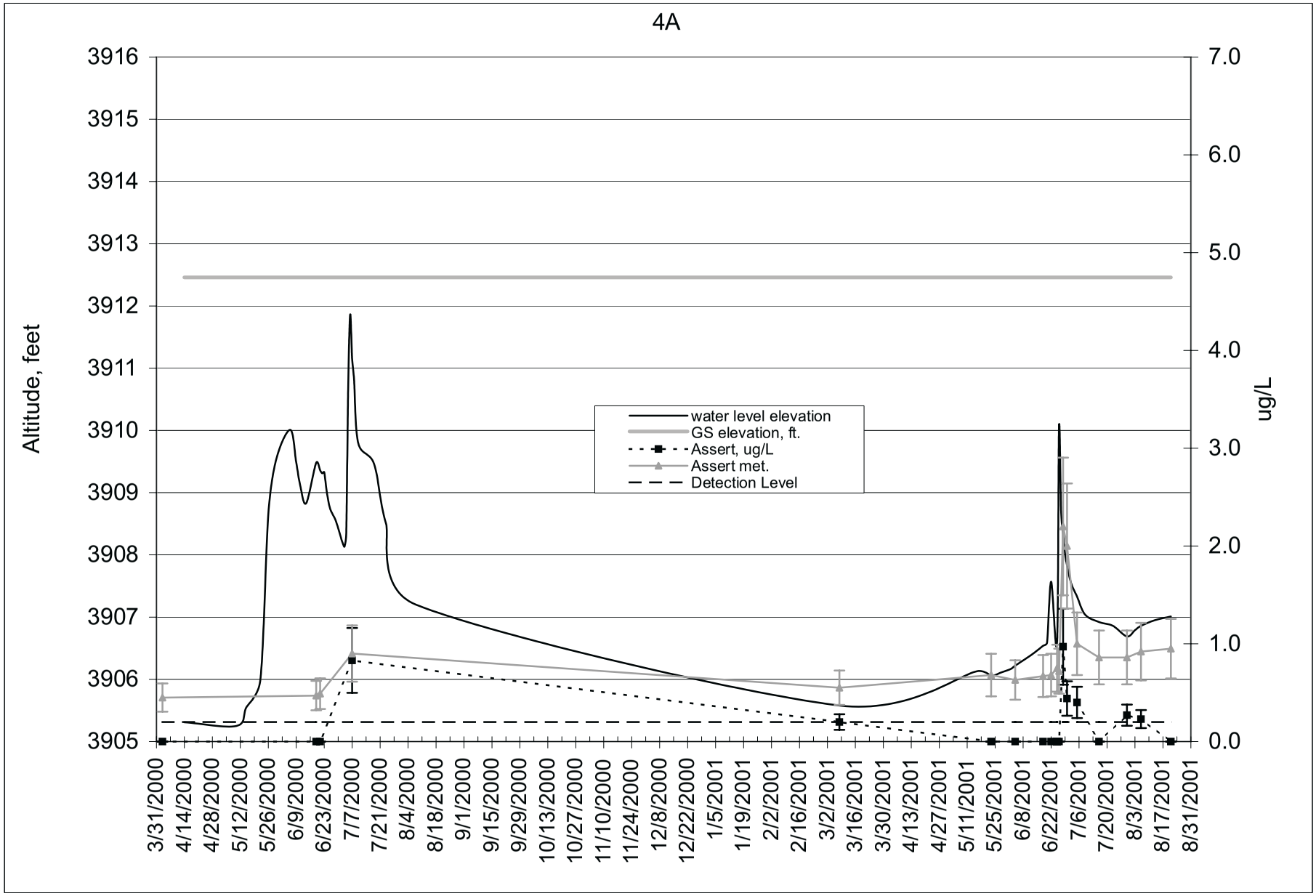

Figure B-13. Hydrograph for well 4A showing Assert and Assert metabolite concentrations.

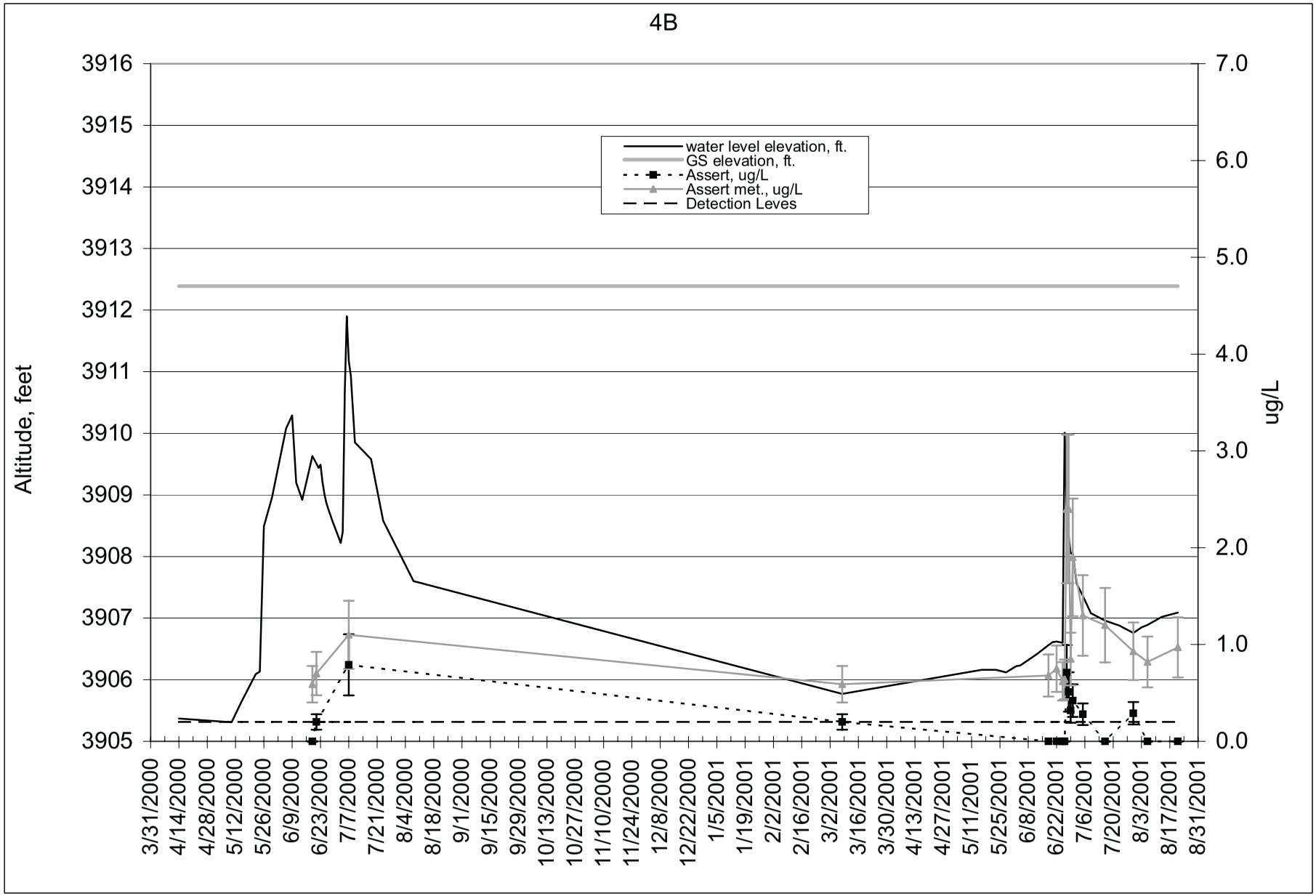

Figure B-14. Hydrograph for well 4B showing Assert and Assert metabolite concentrations.

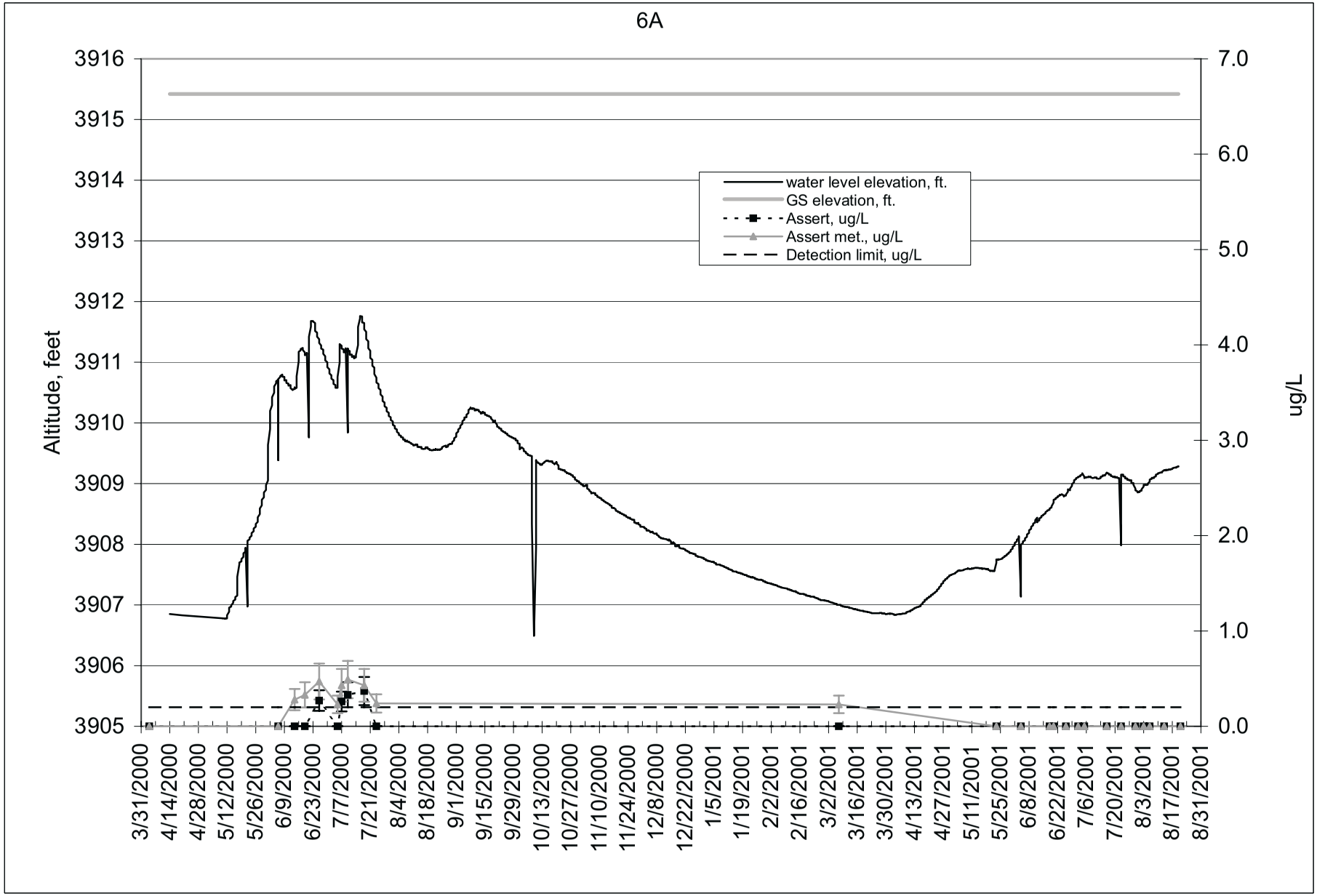

Figure B-15. Hydrograph for well 6A showing Assert and Assert metabolite concentrations.

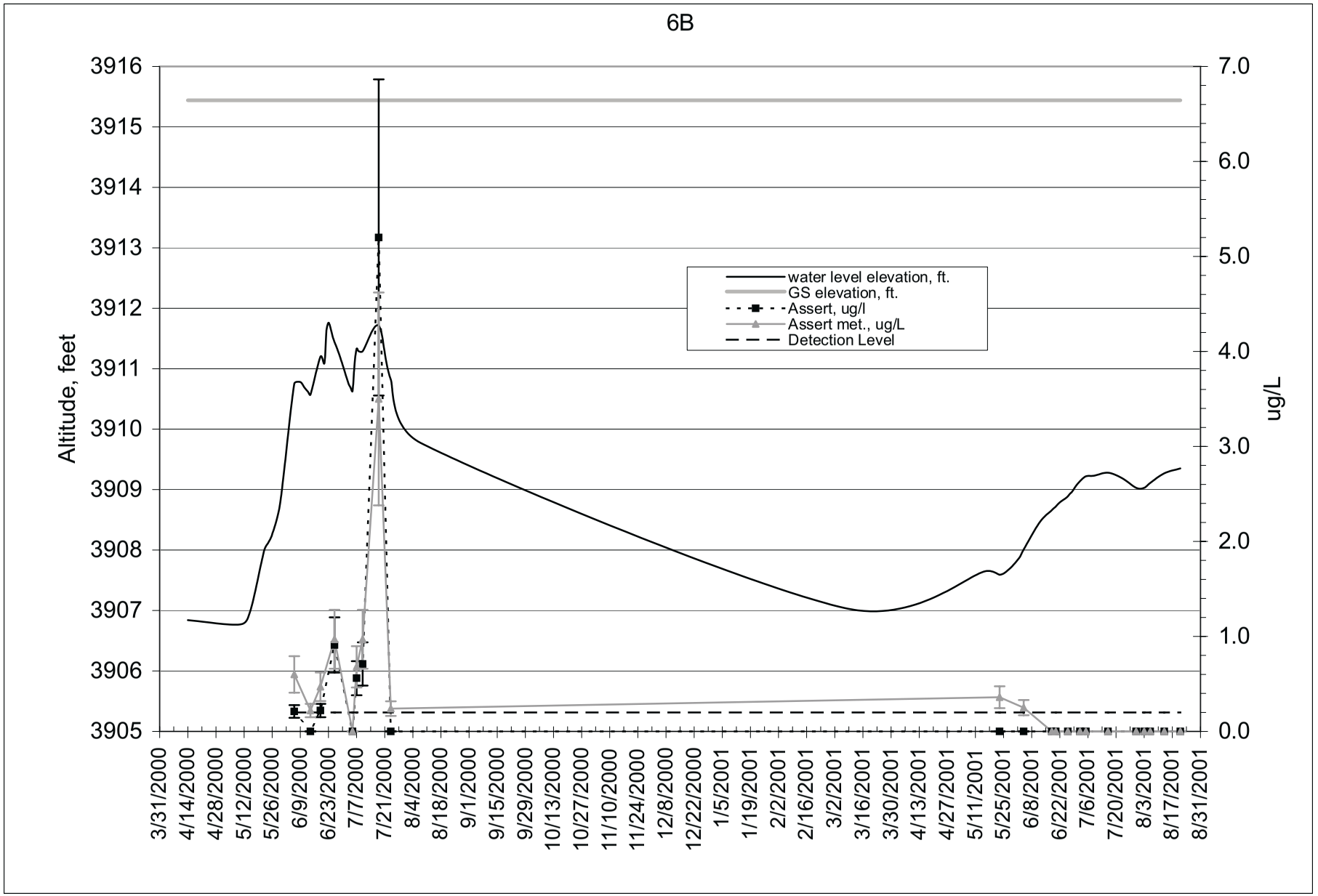

Figure B-16. Hydrograph for well 6B showing Assert and Assert metabolite concentrations.

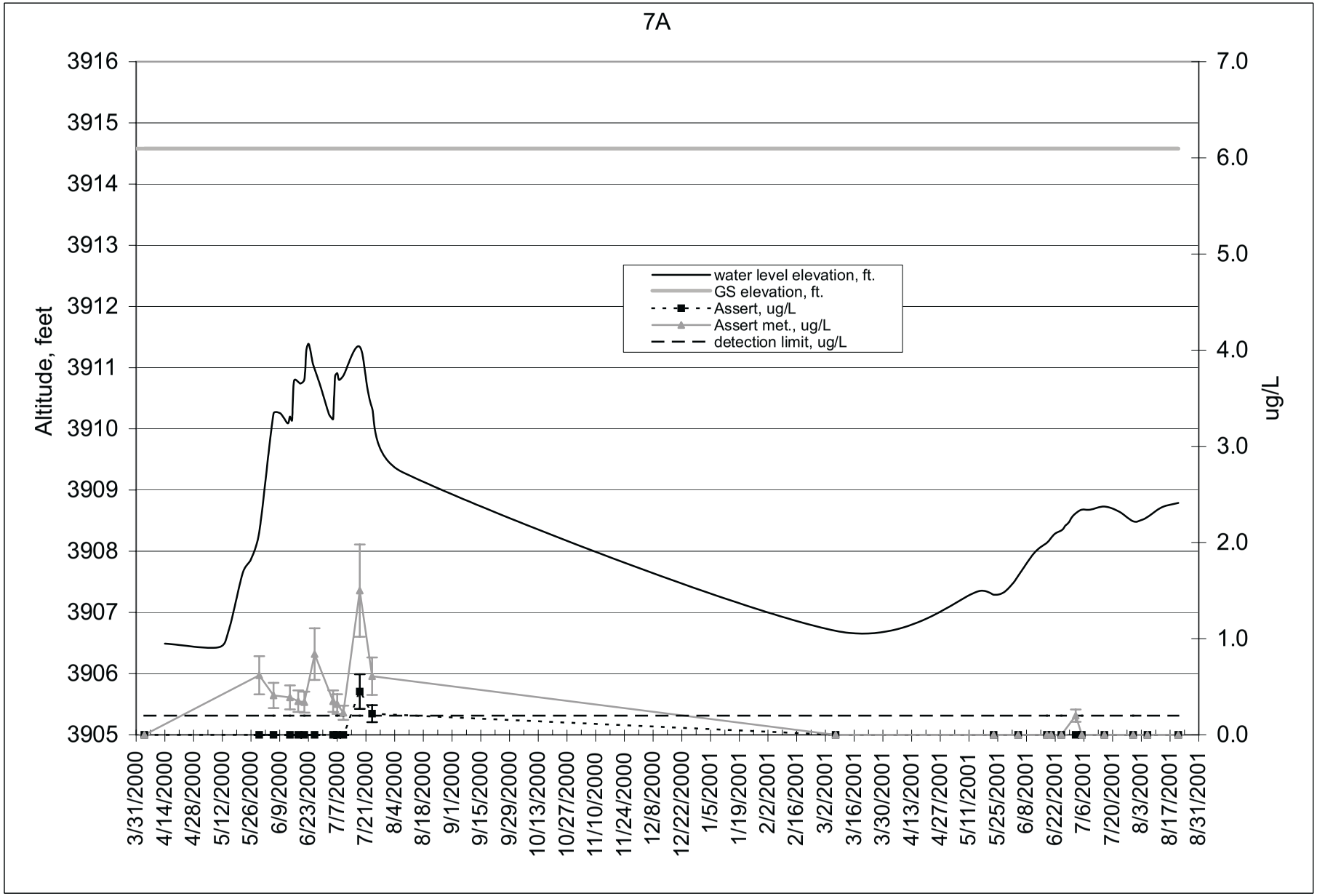

Figure B-17. Hydrograph for well 7A showing Assert and Assert metabolite concentrations.

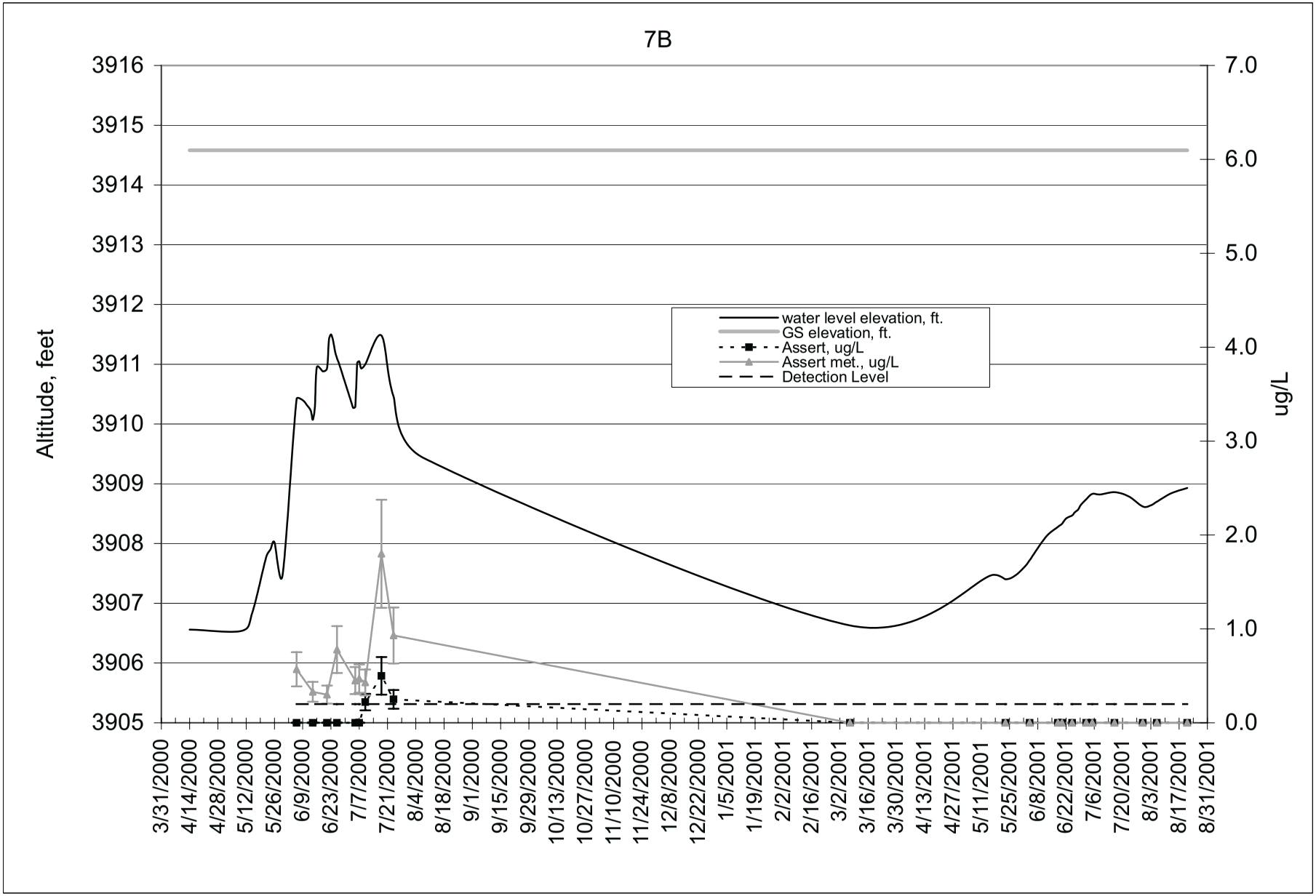

Figure B-18. Hydrograph for well 7B showing Assert and Assert metabolite concentrations.

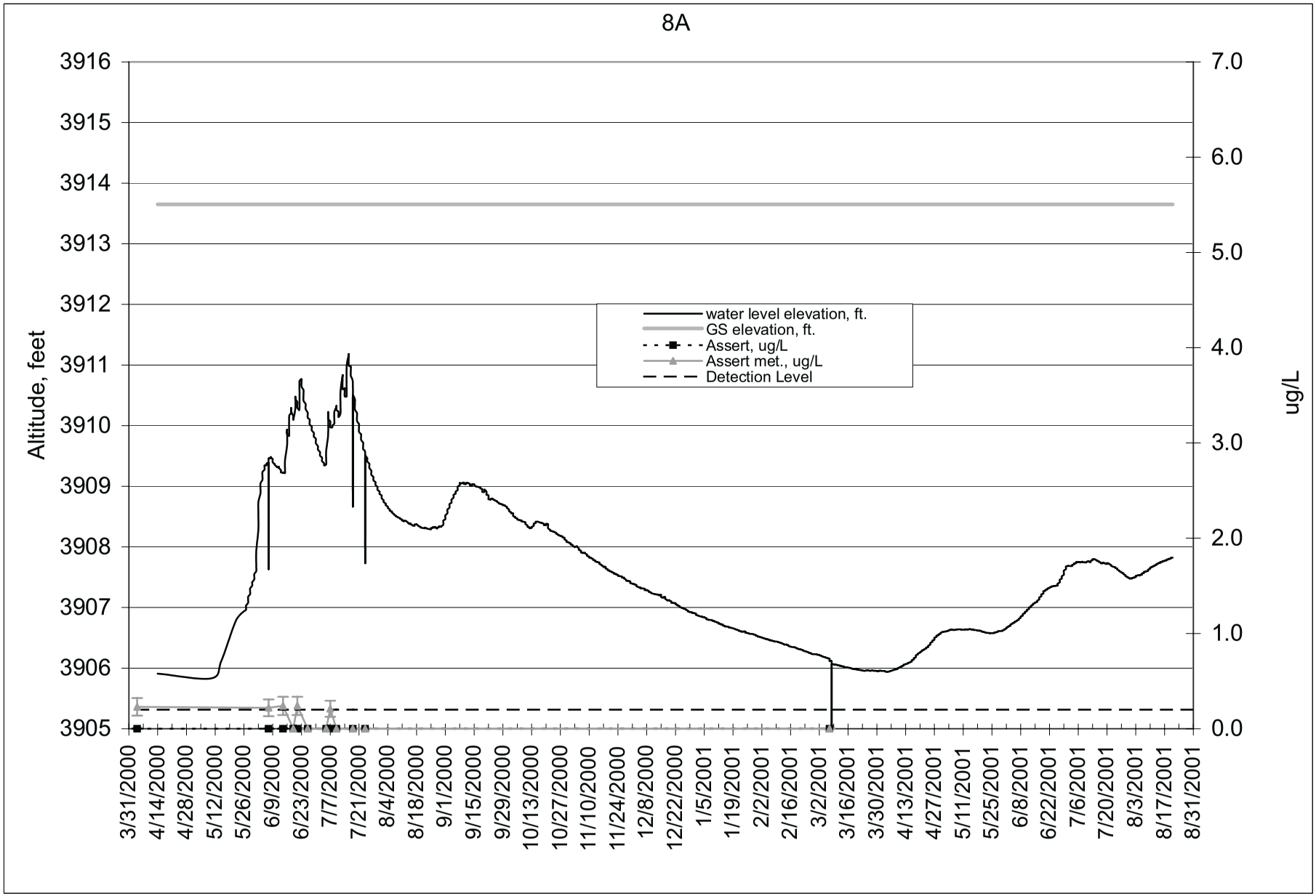

Figure B-19. Hydrograph for well 8A showing Assert and Assert metabolite concentrations.

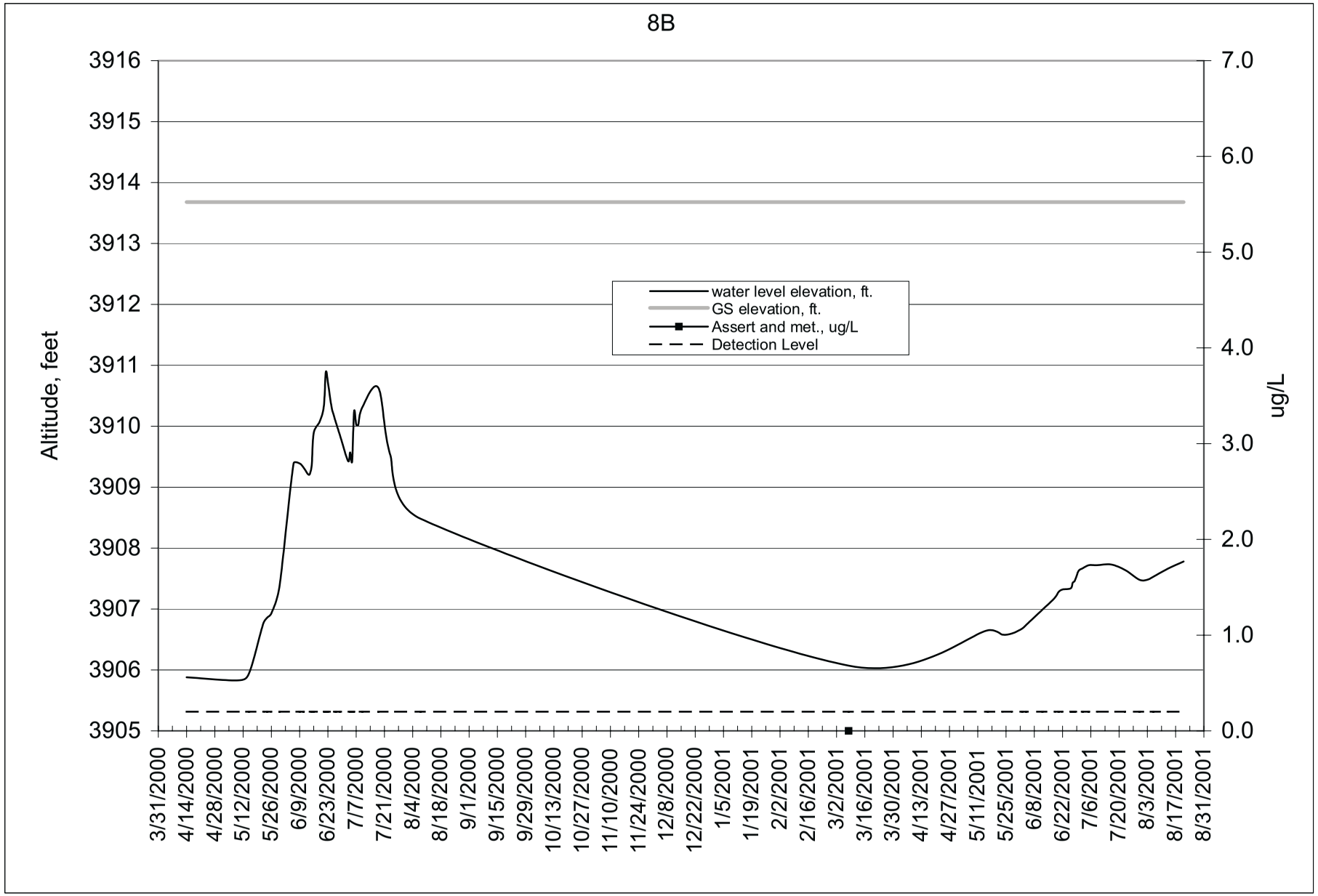

Figure B-20. Hydrograph for well 8B showing Assert and Assert metabolite concentrations.

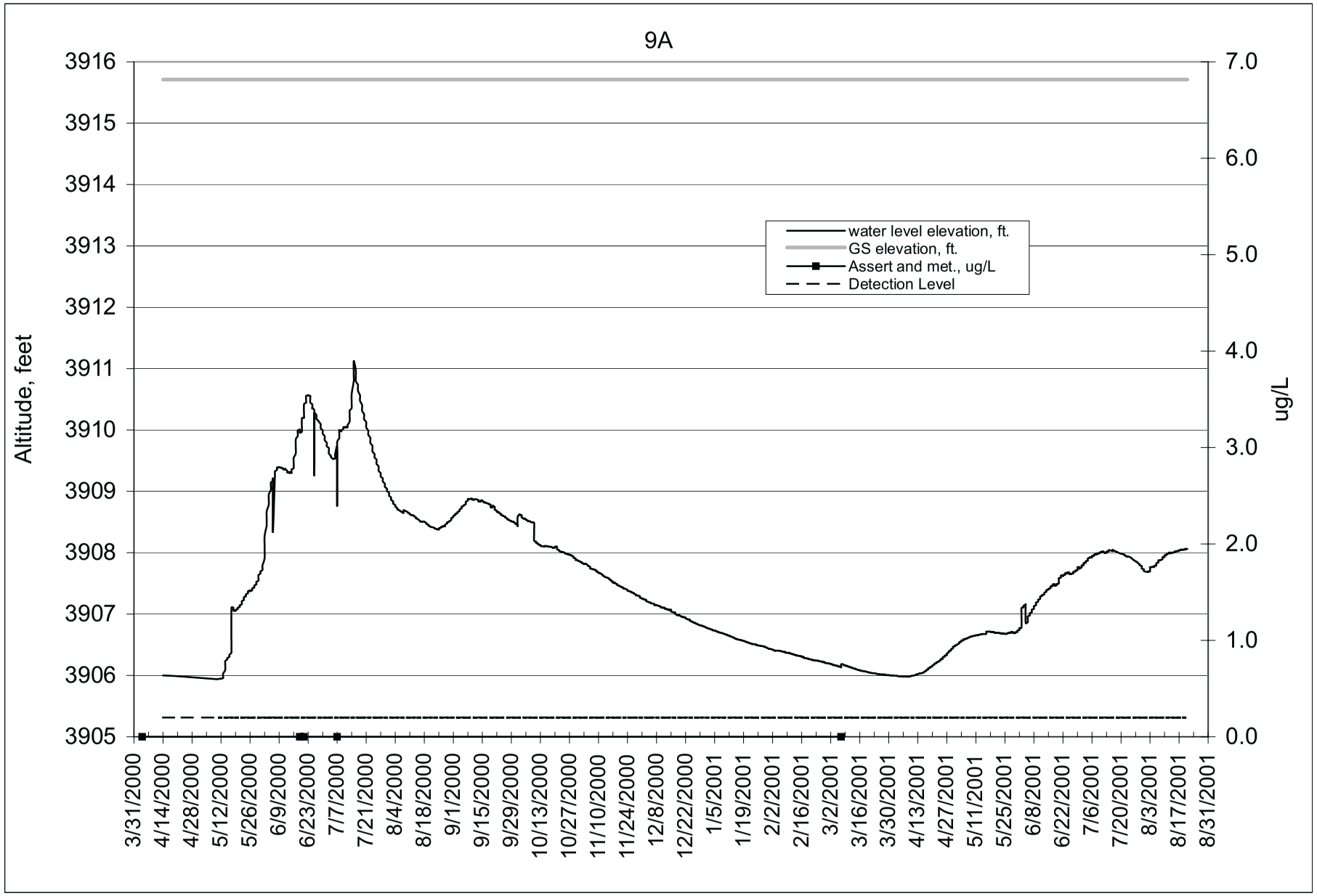

Figure B-21. Hydrograph for well 9A showing Assert and Assert metabolite concentrations.

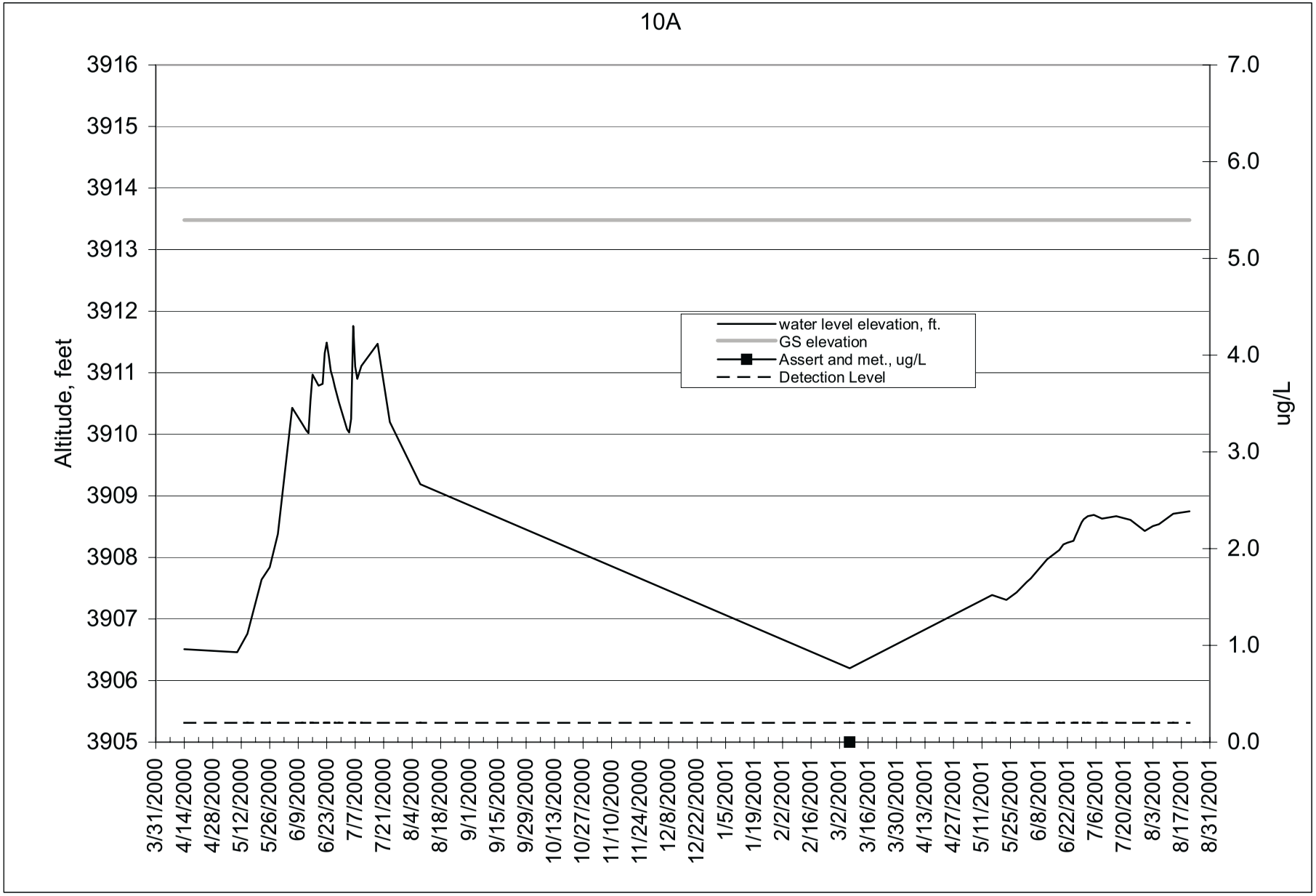

Figure B-22. Hydrograph for well 10A showing Assert and Assert metabolite concentrations.

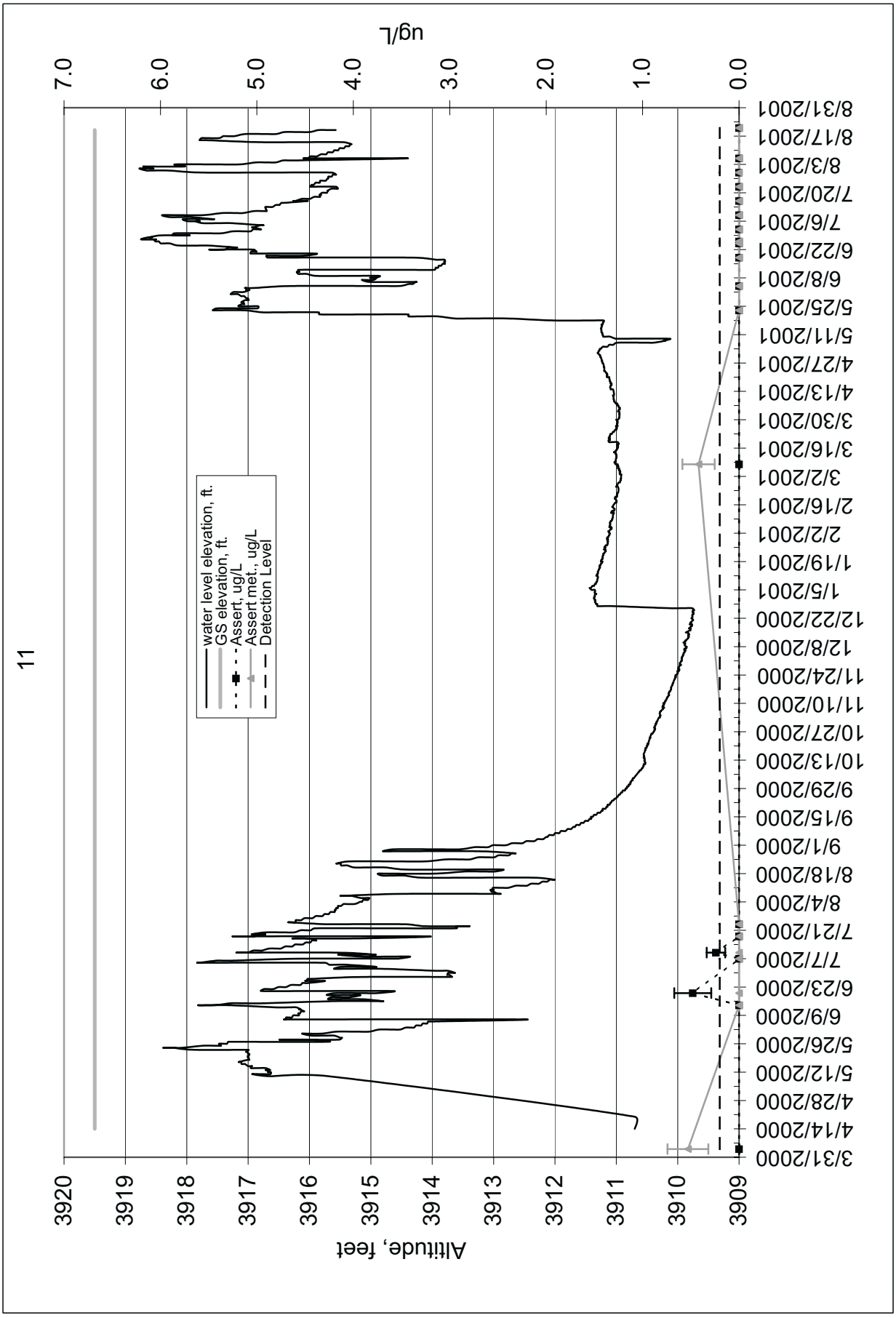

Figure B-23. Hydrograph for well 11 showing Assert and Assert metabolite concentrations.

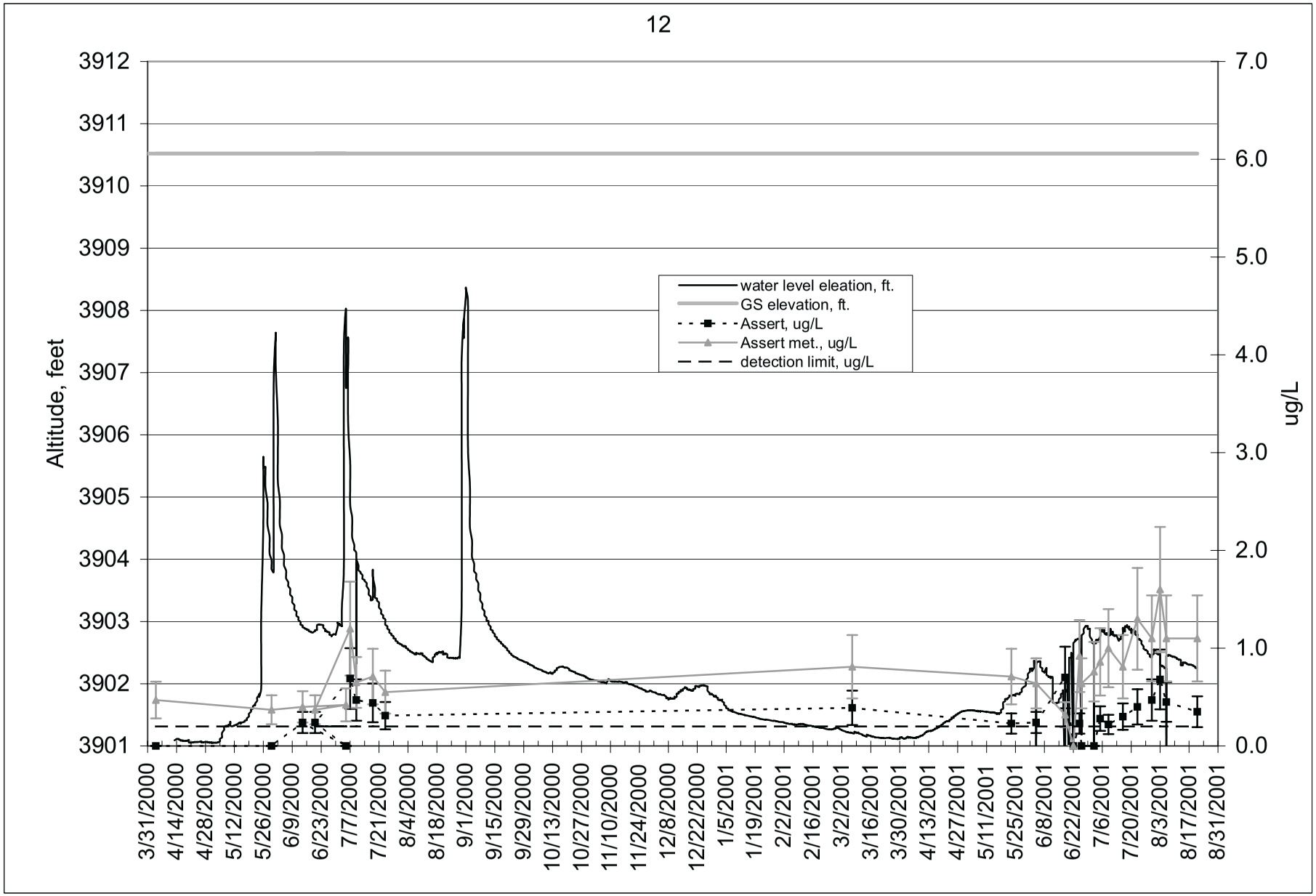

Figure B-24. Hydrograph for well 12 showing Assert and Assert metabolite concentrations.

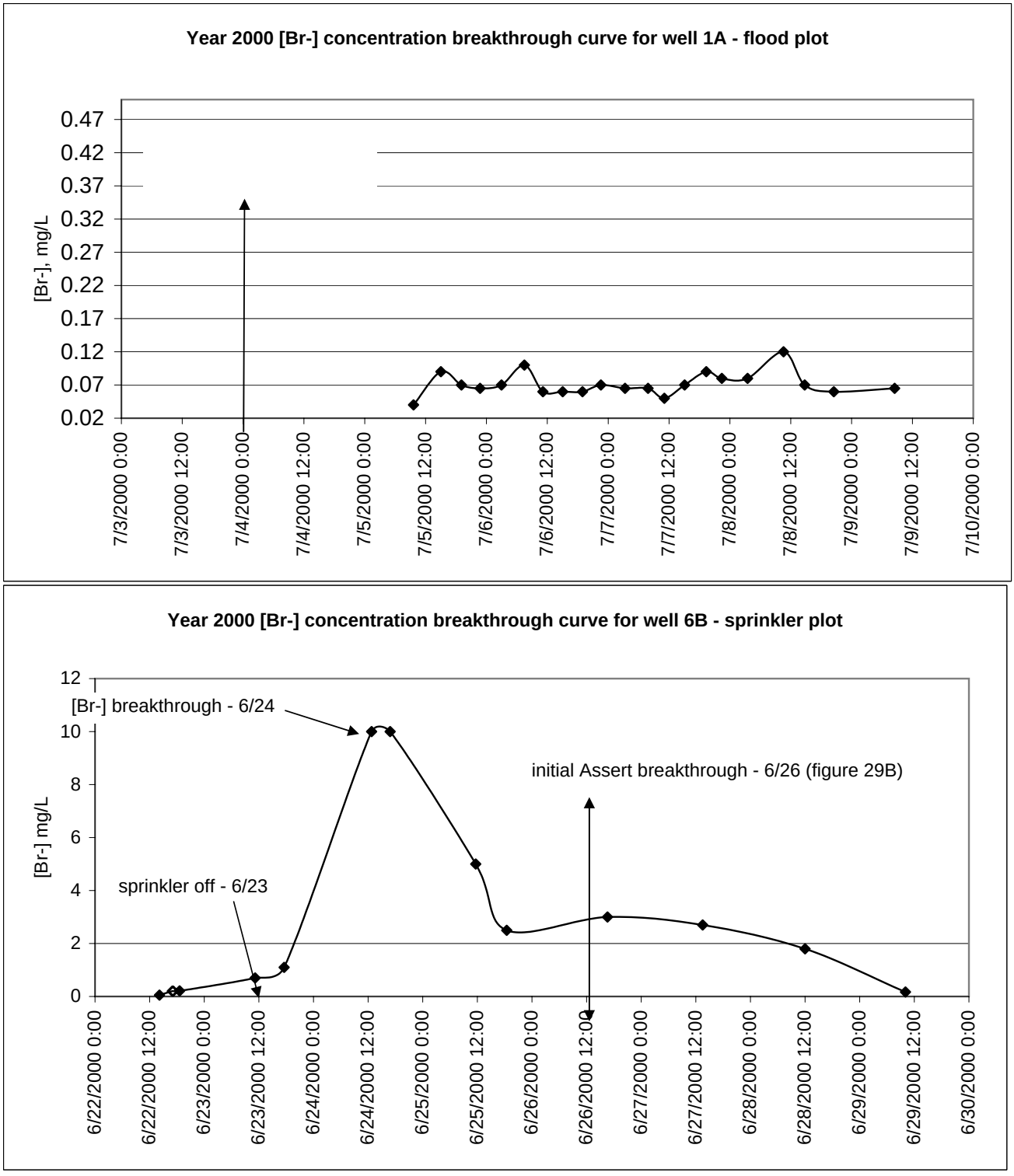

Figure B-25. Year 2000 concentration-breakthrough curves for bromide ion in flood well 2B and in sprinkler well 6B.

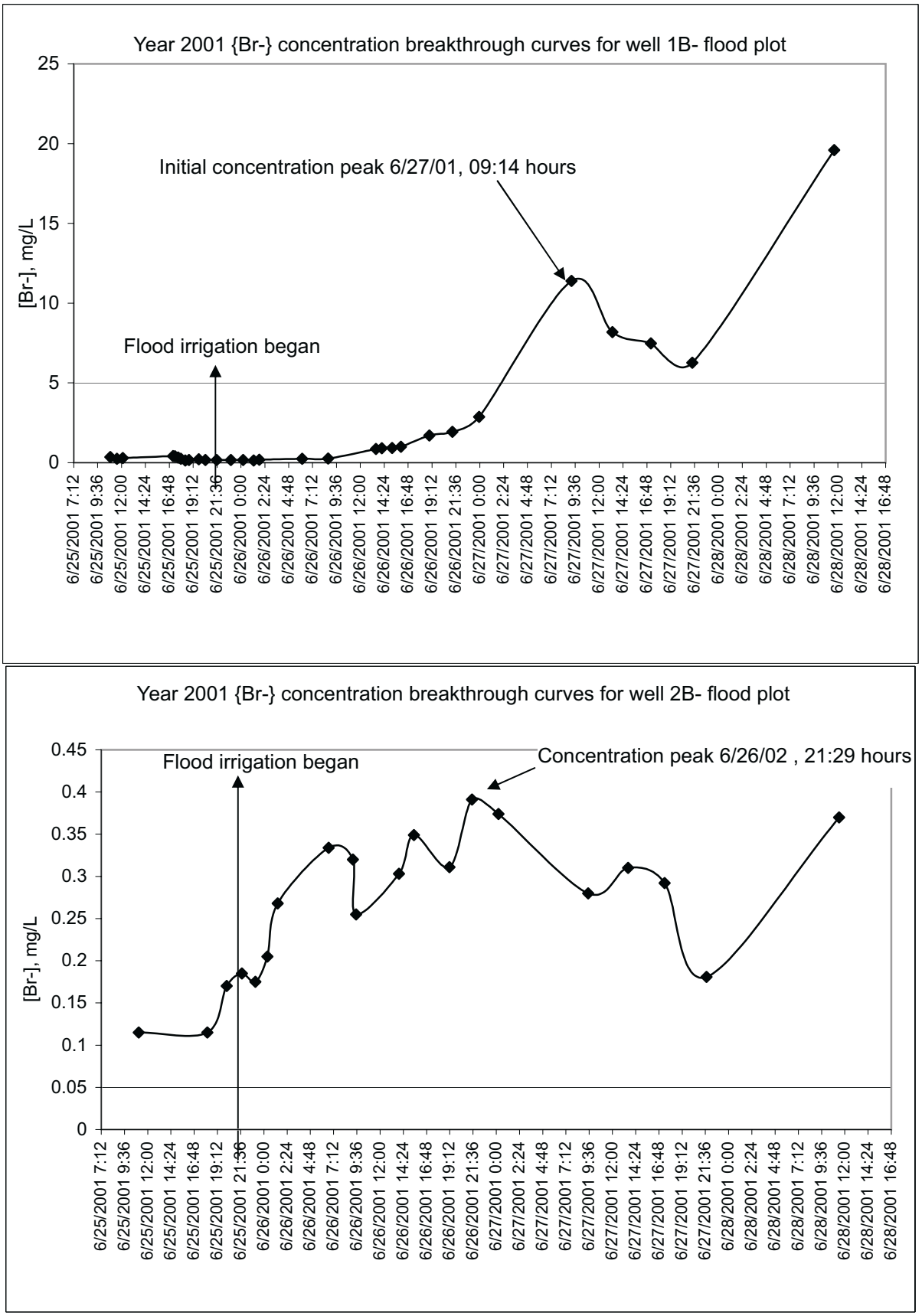

Figure B-26. Year 2001 concentration breakthrough curves for bromide ion in flood wells 1B and 2B during the tracer test.

Appendix B: Well logs for field study plot observation wells.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 1AF

Location Information

GWIC Id: 179253
Location (TRS): 22N 02W 26 CDBC
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG/INV
Latitude (dd): 47.6269
Longitude (dd): -111.8308
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3913.30
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 18.50
Static Water Level (ft): 6.80
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/9/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: 110TRRC
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	18.5	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-1.0	18.5	2.0				PVC

Annular Seal Information

From	To	Description
0.0	7.0	BENTONITE
7.0	21.1	SAND PACK

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
8.5	18.5	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	1.0	DARK CLAY LOAM WITH ORGANICS
1.0	2.5	SILTY FINE SAND TAN WITH BROKEN ROCK FRAGMENTS POOR RECOVERY
2.5	3.5	TAN FINE SANDY CLAY WITH MINOR GRAVEL UP TO 1IN 50 PERCENT RECOVERY
3.5	5.0	TAN FINE SANDY CLAY WITH GRAVELS
5.0	5.5	MD SAND GRADING INTO SANDY CLAY
5.5	6.3	SANDS AND GRAVELS REDDISH WITH COBBLES 73IN
6.3	8.3	SANDS AND GRAVELS WITH MINOR COBBLES
8.3	10.3	3 TO 4IN LAYER OF BLACK AND TAN SAND OVERLYI NG GVLS AND SAND SATURATED 70 PERCENT RECOVERY
10.3	12.3	2 IN LAYER COARSE BLACK AND TAN SAND OVER GRAVELS AND SANDS WITH COBBLES FEW FINES SATURATED 65 PERCENT RECOVERY
12.3	14.3	CLEAN SAND AND GRAVELS REDDISH TAN MINOR COBBLES 100 PERCENT RECOVERY
14.3	16.3	SAME NO COBBLES YELLOWISH SANDSTONE FRAGMENTS 90 PERCENT RECOVERY
16.3	17.1	OVERDRILLED NO RECOVERY
17.1	19.1	WASHED SAND AND GRAVEL OVERLYING REDDISH BROKEN SANDSTONE
19.1	21.1	3 IN LAYER OF CLAY WITH GRAVEL AND SAND OVERLYING DENSE HARD CLAY BROWN MOTTLED WEATHERED SHALE

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *WELL 1BF MBMG

Location Information

GWIC Id: 179259
Location (TRS): 22N 02W 26 CDBC
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 47.6269
Longitude (dd): -111.8308
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3913.40
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 8.90
Static Water Level (ft): 6.90
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/9/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: Not Reported
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	8.9	2.0

Annular Seal Information

From	To	Description
0.0	3.0	BENTONITE
3.0	9.7	SAND PACK

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-1.9	8.9	2.0				PVC

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
3.9	8.9	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	1.0	DK CLAY LAOM WITH ORGANICS
1.0	9.7	TAN SILT SAND AND CLAY WITH GRAVELS

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 2AF

Location Information

GWIC Id: 179260
Location (TRS): 22N 02W 26 CDBD
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 47.6269
Longitude (dd): -111.8294
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3912.70
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 19.20
Static Water Level (ft): 6.90
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/16/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: Not Reported
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	19.2	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-2.8	19.2	2.0				PVC

Annular Seal Information

From	To	Description
0.0	7.2	BENTONITE
7.2	19.5	SAND PACK

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
9.2	19.2	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	0.5	BLACK SILTY CLAY LOAM
0.5	1.5	LT TAN SILTY CLAY
1.5	3.0	LT TAN SANDY SILTY CLAY WITH GRAVEL
3.0	3.7	DK BROWN SILTY CLAY WITH MINOR GRAVEL
3.7	4.7	TAN SILTY SANDY CLAY WITH GRAVEL CALICHE COATING SOME GRAVELS
4.7	5.0	FINE WASHED SAND
5.0	6.0	GRAY TO TAN SILTY SANDY CLAY
6.0	8.0	SANDS GRAVELS AND COBBLES
8.0	10.0	SILTY SANDS WITH GRAVELS WET
10.0	13.0	SANDS AND GRAVELS FEW FINES CALICHE AT 11.7 HARD DRILLING
13.0	15.0	WASHED SAND AND GRAVEL
15.0	16.5	SAND AND GRAVEL SOME COBBLES
16.5	18.0	SAND AND GRAVEL CALICHE ON GRAVEL AT 17.2FT
18.0	18.4	SAND AND GRAVEL 1 TO 3IN
18.4	19.5	GREENISH WEATHERED SHALE

156,

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 2BF

Location Information

GWIC Id:	179261	Source of Data:	LOG
Location (TRS):	22N 02W 26 CDBD	Latitude (dd):	47.6269
County (MT):	TETON	Longitude (dd):	-111.8294
DNRC Water Right:		Geomethod:	TRS-TWN
PWS Id:		Datum:	NAD27
Block:		Altitude (feet):	3912.80
Lot:		Certificate of Survey:	
Addition:		Type of Site:	WELL

Well Construction and Performance Data

Total Depth (ft):	9.30	How Drilled:	HOLLOW STEM
Static Water Level (ft):	7.00	Driller's Name:	BUREC
Pumping Water Level (ft):		Driller License:	
Yield (gpm):		Completion Date (m/d/y):	3/16/2000
Test Type:		Special Conditions:	
Test Duration:		Is Well Flowing?:	
Drill Stem Setting (ft):		Shut-In Pressure:	
Recovery Water Level (ft):		Geology/Aquifer:	Not Reported
Recovery Time (hrs):		Well/Water Use:	MONITORING
Well Notes:			

Hole Diameter Information

From	To	Diameter
0.0	9.3	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-2.8	9.3	2.0				PVC

Annular Seal Information

From	To	Description
0.0	3.7	BENTONITE
3.7	9.7	SAND PACK

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
4.3	9.3	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	0.5	BLACK SILTY CLAY LOAM
0.5	1.5	LT TAN SILTY CLAY
1.5	4.7	LT TAN SANDY SILTY CLAY WITH GRAVEL
4.7	9.7	TAN SILTY SANDY CLAY WITH GRAVELS AND COBBLES

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 3AF

Location Information

GWIC Id: 179262
Location (TRS): 22N 02W 26 CDBD
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 47.6269
Longitude (dd): -111.8294
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3912.20
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 21.90
Static Water Level (ft): 7.20
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/10/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: Not Reported
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	21.9	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-1.9	21.9	2.0				PVC

Annular Seal Information

From	To	Description
0.0	5.0	BENTONITE
5.0	26.0	SAND PACK

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
6.9	21.9	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	1.0	DARK BROWN CLAY LOAM
1.0	6.5	SILTY CLAYEY SAND WITH GRAVELS DRY LIGHT TAN GRAVELS
6.5	8.0	SAME AS ABOVE DAMP WELL ROUNDED COBBLES
8.0	10.0	SANDY CLAY WITH GRAVELS SATURATED
10.0	12.0	GRINDING ON ROCKS LARGE COBBLES IN CUTTING
12.0	14.0	MOSTLY LARGE GRAVELS AND COBBLES WELL ROUNDED AND SORTED
14.0	16.0	GRAVELS AND COBBLES SLOW DRILLING
16.0	18.5	LESS GRINDING
18.5	20.0	GRAVELS COBBLES COBBLES WITH RENEW OF MOIST CLAY SMALLER MORE ANGULAR COBBLES
20.0	22.0	GRAVELS AND COBBLES WET LESS GRINDING
22.0	23.0	FEW CUTTINGS NO GRINDING
23.0	24.5	OVERDRILLED ATTACH SPLIT SPOON FOR SAMPLE
24.5	26.0	DK GRAYGREEN WEATHERED SHALE DENSE HARD DRY MOTTLING WITH REDDISH STAINS

158,

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 3BF

Location Information

GWIC Id: 179263
Location (TRS): 22N 02W 26 CDBD
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 47.6269
Longitude (dd): -111.8294
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3912.40
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 9.40
Static Water Level (ft): 7.30
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/10/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: Not Reported
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	9.3	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-1.9	9.3	2.0				PVC

Annular Seal Information

From	To	Description
0.0	2.7	BENTONITE
2.7	9.6	SAND PACK

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
4.3	9.3	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	1.5	DK BROWN SILTY CLAY LOAM ORGANICS
1.5	3.0	SILTY FINE SAND AND CLAY WITH 50 PERCENT GRAVELS SOME COBBLES DRY
3.0	5.0	CLAY AND FINE TO COARSE SAND WITH GRAVELS AND COBBLES REDDISH TAN CALICHE RINDS ON GRAVELS DRY
5.0	9.7	CLAY FINE TO COARSE SAND WITH GRAVELS AND COBBLES DAMP FEWER FINES

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 4AF

Location Information

GWIC Id: 179254
Location (TRS): 22N 02W 26 CDAD
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG/INV
Latitude (dd): 47.6269
Longitude (dd): -111.8267
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3912.50
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 19.50
Static Water Level (ft): 7.20
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/11/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: 110TRRC
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	19.5	2.0

Annular Seal Information

From	To	Description
0.0	7.5	BENTONITE

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-1.8	19.5	2.0				PVC

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
9.5	19.5	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	7.7	PUSHED AUGER TO 6 FT VERY SOFT NO CUTTINGS RETURNED
7.7	9.0	SILTY FINE SAND AND CLAY TAN FINE GRAVELS UNTIL 9 FT WHERE GRAVELS AND COBBLES ARE 30 PERCENT VERY DAMP
9.0	14.0	AS ABOVE SLIGHTLY WETTER WITH LARGE GRAVELS AND COBBLES
14.0	19.7	VERY MOIST STICKY SILT SAND AND CLAY WITH 50 PERCENT GRAVELS LARGER COBBLES FROM 16 TO 19.7 73IN

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 4BF

Location Information

GWIC Id: 179264
Location (TRS): 22N 02W 26 CDAD
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 47.6269
Longitude (dd): -111.8267
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3912.40
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 8.90
Static Water Level (ft): 7.00
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/12/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: Not Reported
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	8.9	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-2.1	8.9	2.0				PVC

Annular Seal Information

From	To	Description
0.0	3.5	BENTONITE

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
3.9	8.9	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	2.7	PUSHED AUGER SOFT NO RETURN OF CUTTINGS
2.7	5.0	SILTY AND SANDY CLAY WITH MINOR GRAVELS DRY TAN
5.0	9.7	SILTY SANDY CLAYS WITH MINOR GRAVELS AND FEW COBBLES MOIST

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 5AF

Location Information

GWIC Id: 179265
Location (TRS): 22N 02W 26 CDBA
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 47.6278
Longitude (dd): -111.8294
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3913.10
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 19.40
Static Water Level (ft): 7.10
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/20/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: Not Reported
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	19.4	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-2.6	19.4	2.0				PVC

Annular Seal Information

From	To	Description
0.0	7.7	BENTONITE
7.7	19.7	SAND PACK

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
9.4	19.4	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	1.0	BLACK SILTY CLAY LOAM
1.0	6.5	CLAY SILT AND SAND
6.5	10.0	GRAVELS WITH SILT AND SAND LESS FINES GRAVELS UP TO 1/4 IN
10.0	15.0	TAN SILTS AND SANDS WITH GRAVELS MOIST FEW FINES
15.0	18.0	SILT AND SAND WITH GRAVEL
18.0	19.7	WEATHERED BEDROCK SHALE

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 6AS

Location Information

GWIC Id: 179255
Location (TRS): 22N 02W 26 CACC
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG/INV
Latitude (dd): 47.6288
Longitude (dd): -111.8308
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3915.40
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 16.50
Static Water Level (ft): 8.60
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/14/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: 110TRRC
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	16.5	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-0.7	16.5	2.0				PVC

Annular Seal Information

From	To	Description
0.0	5.0	BENTONITE
5.0	17.7	SAND PACK

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
6.5	16.5	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	1.0	BLACK CLAY LOAM WITH ORGANICS
1.5	3.7	LT TAN SILTY SAND MINOR GRAVEL
3.7	5.0	LT TAN SANDY SILT WITH GRAVELS DAMP
5.0	10.0	LT TAN SANDY SILT WITH GRAVELS AND COBBLES FEW FINES
10.0	14.0	LARGER GRAVELS AND COBBLES
14.0	14.7	EASIER DRILLING QUIET WEATHERED BEDROCK
14.7	17.7	WEATHERED BEDROCK

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 6BS

Location Information

GWIC Id: 179266
Location (TRS): 22N 02W 26 CACC
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 47.6288
Longitude (dd): -111.8308
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3915.40
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 8.60
Static Water Level (ft): 8.60
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/14/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: Not Reported
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	8.6	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-0.5	8.6	2.0				PVC

Annular Seal Information

From	To	Description
0.0	4.2	BENTONITE
4.2	9.7	SAND PACK

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
3.6	8.6	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	1.0	BLACK CLAY LOAM
1.0	4.7	LT TAN SILTY SAND WITH MINOR GRAVELS
4.7	8.0	LT TAN SANDY SILT WITH GRAVEL
8.0	8.0	SAND WITH MINOR GRAVEL

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 7AS

Location Information

GWIC Id: 179267
Location (TRS): 22N 02W 26 CACD
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 47.6288
Longitude (dd): -111.8294
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3914.60
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 17.20
Static Water Level (ft): 8.10
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/15/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: Not Reported
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	17.2	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-0.7	17.2	2.0				PVC

Annular Seal Information

From	To	Description
0.0	6.0	BENTONITE

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
7.2	17.2	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	1.0	DK BLACK CLAY LOAM
1.0	6.7	LT TAN SILTY CLAY MINOR GRAVEL
6.7	9.7	CLAY AND GRAVEL
9.7	13.2	LT TAN SILTY SANDY CLAY W/GRAVELS
13.2	14.0	HARD DRILLING MAYBE CALICHE HORIZON SATURATED CLAYS AND GRAVELS
14.0	16.3	SANDY GRAVELS WITH COBBLES SATURATED
16.3	19.7	DK GREEN MOTTLED CLAY WEATHERED BEDROCK SHALE

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 7BS

Location Information

GWIC Id: 179268
Location (TRS): 22N 02W 26 CACD
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 47.6288
Longitude (dd): -111.8294
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3914.70
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 9.50
Static Water Level (ft): 8.10
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/15/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: Not Reported
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	9.5	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-0.5	9.5	2.0				PVC

Annular Seal Information

From	To	Description
0.0	4.0	BENTONITE

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
4.5	9.5	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	1.0	DK BLACK CLAY LOAM
1.0	6.7	LT TAN SILTY CLAY MINOR GRAVEL
6.7	9.7	LT TAN SILTY CLAY WITH GRAVELS

- All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 8AS

Location Information

GWIC Id: 179269
Location (TRS): 22N 02W 26 CACD
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 47.6288
Longitude (dd): -111.8294
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3913.70
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 19.50
Static Water Level (ft): 7.70
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/13/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: Not Reported
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	19.5	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-0.6	19.5	2.0				PVC

Annular Seal Information

From	To	Description
0.0	7.7	BENTONITE
7.7	19.7	SAND PACK

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
9.5	19.5	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	1.0	DK CLAY LOAM WITH ORGANICS
1.0	2.5	CLAY LOAM OVER TAN SILTY FINE SANDY CLAY SLIGHTLY MOIST
2.5 1	4.0	AS ABOVE THEN FINE SANDS AND GRAVELS WITH COBBLES TAN DRY SOME CALICHE ON COBBLES FEW FINES
4.0	6.0	AS ABOVE POOR RECOVER END OF SPLIT SPOON SAMPLING
6.0	10.0	TAN SANDS AND GRAVELS WELL ROUNDED AND SORTED DAMP
10.0	15.0	GRAVELS AND COBBLES LESS SAND
15.0	17.0	GRAVELS AND COBBLES COVERED WITH WET STICKY SILTY SANDY CLAY LESS GRINDING ON GRAVELS
17.0	19.7	GREENISH GRAY SILTY CLAY LENSE WEATHERED BEDROCK

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 8BS

Location Information

GWIC Id: 179270
Location (TRS): 22N 02W 26 CACD
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 47.6288
Longitude (dd): -111.8294
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3913.70
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 9.50
Static Water Level (ft): 7.80
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/13/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: Not Reported
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	9.5	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-0.7	9.5	2.0				PVC

Annular Seal Information

From	To	Description
0.0	3.7	BENTONITE
3.7	9.7	SAND PACK

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
4.5	9.5	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	1.0	DK CLAY LOAM WITH ORGANICS
1.0	4.0	SILTY SANDY CLAY WITH SMALL GRAVELS
4.0	5.0	SILTY SANDS CLAY WITH 50 PERCENT GRAVELS
5.0	9.7	CLEAN GRAVELS WITH SAND AND COBBLES

1 - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 9AS

Location Information

GWIC Id: 179256
Location (TRS): 22N 02W 26 CACA
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG/INV
Latitude (dd): 47.6297
Longitude (dd): -111.8294
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3915.70
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 14.70
Static Water Level (ft): 9.70
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/13/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: 110TRRC
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	14.7	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint Type
-0.5	14.7	2.0			PVC

Annular Seal Information

From	To	Description
0.0	3.7	BENTONITE

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
4.7	14.7	2.0			.020 SLOTTED PVC

Lithology Information

From	To	Description
0.0	1.3	DK BLACK CLAY LOAM WITH ORGANICS
1.3	2.5	TAN SILTY CLAY WITH MINOR SAND AND GRAVEL SLIGHTLY MOIST
4.5	9.5	TAN GRAVELS WITH SILTS SAND AND CLAY SLIGHTLY DAMP
9.5	14.0	SAME BUT WITH COBBLES IN CUTTINGS
14.0	14.3	NO RETURN WILL USE SPLIT SPOON TO COLLECT SAMPLE
14.3	16.3	GREENISH BLACK SILTY CLAY DENSE WEATHERED BEDROCK

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 9BS

Location Information

GWIC Id: 179271
Location (TRS): 22N 02W 26 CACA
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 47.6297
Longitude (dd): -111.8294
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3916.10
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 9.60
Static Water Level (ft):
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/14/2000
Special Conditions: DRY
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: Not Reported
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	9.6	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-0.5	9.6	2.0				PVC

Annular Seal Information

From	To	Description
0.0	3.6	BENTONITE
3.6	9.7	SAND PACK

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
4.6	9.6	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	1.3	DK BLACK CLAY LOAM WITH ORGANICS
1.3	4.5	TAN SILTY CLAY WITH MINOR SAND AND GRAVELS
4.5	9.7	TAN GRAVELS WITH SILT SAND AND CLAY SLIGHTLY DAMP

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 10AS

Location Information

GWIC Id: 179272
Location (TRS): 22N 02W 26 CACD
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 47.6288
Longitude (dd): -111.8294
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3913.50
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 19.30
Static Water Level (ft): 7.00
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/20/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: Not Reported
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	19.3	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-0.5	19.3	2.0				PVC

Annular Seal Information

From	To	Description
0.0	7.0	BENTONITE

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
9.3	19.3	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	3.0	SILTY DK CLAY LOAM SILT AND SAND
3.0	4.5	TAN SILTY SANDY CLAY WITH 20 PERCENT GRAVEL SLIGHTLY MOIST
4.5	6.0	70 PERCENT ROUNDED GRAVELS WITH SILT AND SAND FEW FINES
6.0	7.5	AS ABOVE MAYBE LESS GRAVEL
7.5	9.5	SILT SAND AND CLAY WITH GRAVELS SAND SEAM AT 9 FT
9.5	14.5	GRAVELS AND COBBLES WITH SILT AND SAND SOME CLAY COBBLES ANGULAR MOIST
14.5	16.5	GRAVELS AND COBBLES WITH SILT SAND AND CLAY MORE COBBLES THAN ABOVE
16.5	18.0	GRAVELS AND COBBLES WITH SILTS AND SOME CLAY LITTLE SAND WET
18.0	19.5	WEATHERED SHALE

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 11AU

Location Information

GWIC Id: 179257
Location (TRS): 22N 02W 26 CCBD
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG/INV
Latitude (dd): 47.6269
Longitude (dd): -111.8350
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3919.50
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 18.50
Static Water Level (ft):
Pumping Water Level (ft): 8.80
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/18/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: 110TRRC
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	18.5	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-3.0	18.5	2.0				PVC

Annular Seal Information

From	To	Description
0.0	7.0	BENTONITE

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
8.5	18.5	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	0.5	BLACK SILTY CLAY LOAM
0.5	4.0	LT TAN SILTY CLAY FEW GRAVELS
4.0	7.0	LT TAN SILTY CLAYEY SAND WITH GRAVEL
7.0	10.0	LT TAN SILTY CLAY WITH GRAVELS
10.0	13.0	GRAVELS WITH FINE SAND
13.0	16.0	AS ABOVE WITH LARGER GRAVEL
16.0	20.0	AS ABOVE WITH GRAVELS AND COBBLES

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
OSTBERG CHRIS *MBMG WELL 12AD

Location Information

GWIC Id: 179258
Location (TRS): 22N 02W 26 CDAD
County (MT): TETON
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:

Source of Data: LOG/INV
Latitude (dd): 47.6269
Longitude (dd): -111.8267
Geomethod: TRS-TWN
Datum: NAD27
Altitude (feet): 3910.50
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 21.20
Static Water Level (ft): 9.50
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: HOLLOW STEM AUGER
Driller's Name: BUREC
Driller License:
Completion Date (m/d/y): 3/17/2000
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: 110TRRC
Well/Water Use: MONITORING

Hole Diameter Information

From	To	Diameter
0.0	21.2	2.0

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-2.7	21.2	2.0				PVC

Annular Seal Information

From	To	Description
0.0	9.0	BENTONITE

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
11.2	21.2	2.0			.020 SLOTTED SCREEN

Lithology Information

From	To	Description
0.0	0.5	BLACK SILTY CLAY LOAM
0.5	2.7	MD GRAY SILTY CLAY MINOR GRAVEL
2.7	6.0	LT TAN SANDY SILTY CLAY WITH GRAVEL
6.0	10.0	AS ABOVE BUT BIGGER GRAVELS
10.0	12.0	DAMP SILTY SAND WITH GRAVEL
12.0	16.0	TAN CLAYEY SILTY SAND WITH GRAVEL SATURATED
16.0	22.3	AS ABOVE WITH LARGER GRAVEL AND SOME COBBLES FEW FINES
22.3	24.7	WEATHERED BEDROCK SHALE

[1] - All diameters reported are **inside** diameter of the casing.

Appendix B: Burns and Mitman soil microbiology report

Greensfield Bench
Final Report by B. Burns and G. Mitman, Montana Tech Biology Department, January 2002

Samples were taken from a ranch on the Greensfield Bench near Fairfield, Montana. Each year the fields on the ranch are burned, prior to planting, to eliminate the stubble from the previous year. Assert is a herbicide that is commonly used to kill wild oats when raising barley and should degrade in the soil primarily by microbial means. However, the Assert concentrations are not degrading to the levels they should be. Since temperature affects microbial growth, this burning could affect the microbial numbers, which could result in the Assert not being properly degraded.

Samples were taken before the burning off the field and after the burning. Samples were also taken at a designated "never-burn" site at each time. Samples will be taken to further monitor the microbial numbers. Samples are taken from two plots on the land: a flood plot and a sprinkler plot. From each plot fifteen samples are taken in a W pattern to form a random composite.

A live/dead bacteria stain was then used on each sample to determine microbial numbers. Each sample was divided into three subsamples and the bacteria counts performed in triplicate for each subsample. An initial live/dead stain is performed in order to determine the best dilution for bacterial counts. The diluted sample is then stained with two components (A and B) and left in the dark for 15 minutes. After this, the sample is run through a 13-mm filter, which retains the bacteria and allows the liquid to pass through. This filter is then observed with a fluorescent microscope. Live bacteria will appear green and dead bacteria appear red. An average count is obtained to give the number of bacteria per mL of soil.

The before burn samples were diluted 1:100,000 and after burn were diluted 1:10,000. The results of the bacteria counts for each plot, before and after burn, are shown below.

Spring 2001

		Before Burn		**After Burn**	
		live	dead	live	dead
Flood Plot		4.920×10^9	1.796×10^9	9.567×10^8	3.728×10^8
Sprinkler Plot		5.223×10^9	1.805×10^9	8.733×10^8	3.490×10^8
Never Burn 4 inches		5.584×10^9	1.620×10^9	7.309×10^8	4.144×10^8
Never Burn Surface		5.675×10^9	1.978×10^9		

*never burn 4 inches and never burn surface samples were taken before burn and a never burn composite was taken after burn.

The microbial numbers all decreased by a power of ten indicating that the burn could possibly be responsible for a decrease in the microbial numbers of the soil.

Nutrient agar plates were prepared to obtain isolates of the different types of bacteria found in the soil. The samples were again divided into three subsamples and diluted. The before burn samples were diluted 1:10,000, 1:100,000, and 1:1,000,000. The after burn samples were diluted 1:1000, 1:10,000, and 1:100,000. One milliliter of dilution was then used to inoculate the plates of nutrient agar. Three plates were prepared and inoculated for each dilution of each subsample.

Isolates of each different type of bacteria (based on color and shape) were sampled from the plates and transferred to nutrient agar slants. Nine different types of bacteria were isolated. These isolates were then used to determine which types could possibly use Assert as a carbon source.

Sampling was done by the Bureau of Mines and geology to determine the maximum and minimum Assert concentrations in the soil. The bacterial isolates were then grown on plates at a range of concentrations from 50-2000 ppb Assert. The plates were prepared of nutrient agar and Assert was added to achieve the desired concentration. Three plates of each concentration were prepared and each plate was streaked with each of the nine isolates as shown:

small pink	medium wrinkled white
shiny yellow	medium white
yellow smooth	medium white smooth
small yellow	large white
small white smooth	

The plates were then incubated at a temperature of 5 degrees Celsius (average soil temperature determined by Bureau of Mines and Geology). Growth on each plate was monitored and the results are shown in table 2 and table 3. After initial inoculation (October 18,2001), plates were checked every other day and no growth occurred until 11 days after inoculation. After initial growth, plates were checked weekly and no further significant growth occurred until November 27, 2001.

Table 2-bacteria growth on 10/29/01

	small pink	shiny yellow	yellow smooth	small yellow	small white smooth	med. wrinkled white	med. white	large white	med white smooth
Assert conc.									
50			x				x	x	slight
50	x		x						
50			x						
100	slight		x						
100	x		x						
100	x		x						
250	x		x						
250	slight		x						
250			x						
500			x					slight	
500			x						
500	x		x						
1000			x			slight			
1000			x						
1000			x						
1500			x						
1500			x						
1500			x						
2000	slight		x						
2000			x						
2000			x						

Table 3-bacteria growth on 11/27/01

	small pink	shiny yellow	yellow smooth	small yellow	small white smooth	med. wrinkled white	med. white	large white	med white smooth
Assert conc.									
50	x		x		x	slight	x	x	slight
50	x		x	slight	x	slight		x	
50	x		x	x	x	x		x	
100	x		x	x	x	x		x	
100	x		x	x	x	x		x	
100	x		x	x	x	x		x	
250	x		x	x	x	x		x	
250	x		x	x	x	x		x	
250	x		x	x	x	slight		x	
500	x		x	x	x	slight		x	
500	x		x	x	x	x		x	
500	x		x	x	x	x		x	
1000	x		x	x	x	slight		x	
1000	x		x	x	x	slight		x	
1000	x		x	x	x	x		x	
1500	x		x	x	x	x		x	
1500	x		x	x	x	x		x	
1500	x		x	x	x	x		x	
2000	x		x	x	x	x		x	
2000	x		x	x	x	x		x	
2000	x		x	x	x	x		x	

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The microbial numbers all decreased by a power of ten after the burn indicating that the burn could be responsible for the decrease in live bacteria. The yellow smooth was the only bacteria to grow on assert after 11 days of incubating at the average soil temperature. After almost a month of incubation, all other bacteria (except shiny yellow, medium white, and medium white smooth) were growing well at all concentrations and the yellow smooth increased in amount.