

Project: KI23918.A0

APPENDICES

KITCHENER TOWNHOUSE STUDY

SOIL GAS VENTILATION AS A
REMEDIAL MEASURE FOR METHANE
ENTRY INTO BASEMENTS

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APPENDIX A

SUMMARY OF FIELD RESULTS

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APPENDIX A-1

SPOT CHECKS ON METHANE CONCENTRATIONS

(all concentrations in ppm unless otherwise noted)

Unit #

Date	Time	Block A						Block B				
		74	73	72	71	56	55	54	53			
March 21	12:30	10	110	150	520	4	28	4	2			
21	22:30	10	22	24	70	2	26	2	4			
22	10:30	4	8	7	16	5	33	6	4			
23	14:00	10	13	94	19% LEL	13	48	19	23			
24	15:40	-	-	6.5% LEL	34% LEL	-	-	-	-			
25	16:45	-	-	4.1% LEL	29% LEL	-	-	-	-			
26	07:45	-	-	0% LEL	1.9% LEL	-	-	-	-			
26	21:15	-	-	2.5% LEL	21% LEL	-	-	-	-			
27	09:30	9	106	6.7% LEL	30% LEL	11	45	14	9			
27	16:00	5	98	8.3% LEL	31% LEL	6	40	8	4			
27	23:00	9	100	6.0% LEL	28% LEL	7	60	10	3			
28	10:45	-	-	9.3% LEL	55% LEL	-	-	-	-			
28	15:30	-	-	11% LEL	55% LEL	-	-	-	-			
28	22:00	-	-	7.3% LEL	30% LEL	-	-	-	-			
29	09:00	-	-	100	200	-	-	-	-			
29	16:00	-	-	96	600	-	-	-	-			
29	21:55	-	-	60	70	-	-	-	-			
30	10:30	-	-	5.2% LEL	34% LEL	-	-	-	-			
30	14:15	90	110	6.6% LEL	37% LEL	3	25	4	13			
31	11:45	70	100	3.3% LEL	24% LEL	4	17	3	4			
31	22:45	35	90	100	7.3% LEL	1	12	2	2.5			

SPOT CHECKS ON METHANE CONCENTRATIONS
(all concentrations in ppm unless otherwise noted)
(Continued)

Date	Time	Block A					Block B					
		74	73	72	71	56	55	54	53			
April 1	17:05	-	-	20	200	-	-	-	-	-	-	-
3	10:30	100	350	6.1% LEL	20% LEL	4	70	6	2	7.0	2	7.0
13	15:30	5	18	110	320	6.5	20	9.5	2	2	2	2
14	17:45	10	3.0	5.5% LEL	22% LEL	3.0	18	2	5.5	4.0	5.5	4.0
14	23:45	4.5	80	9.4% LEL	34% LEL	5.5	22	5.5	7.4	5.5	7.4	5.5
15	10:30	6.4	50	4.7% LEL	14% LEL	6.0	22	22	22	22	22	22
18	15:00	Start pumping in Block A										
18	15:30	28	11	100	900	1.5	15	3.0	3.0	1.5	15	1.5
19	09:00	3.0	4.5	8.5	20	4.0	17	5.0	4.5	4.0	17	4.5
19	16:00	2.0	3.0	3.0	9.5	2.0	10	3.5	3.0	2.0	10	3.0
20	11:00	5.5	8.0	8.5	12.0	6.0	21	7.5	5.0	6.0	21	5.0
21	10:30	3.5	5.5	7.0	17.0	3.5	15	-	-	3.5	15	-
21	17:00	1.0	2.0	2.0	6.0	1.0	13	2.5	1.0	1.0	13	1.0
22	11:00	1.5	3.0	4.5	15	2.0	12	3.0	2.5	2.0	12	2.5
25	11:30	2.0	3.0	6.5	7.5	3.0	25	5.5	3.5	3.0	25	3.5
26	00:00	7.0	13	11	28	9.0	35	9.0	8.0	9.0	35	8.0
27	09:30	3.0	5.0	10	29	3.0	27	5.0	3.5	3.0	27	3.5
27	17:00	Add additional well in unit 71										
28	10:00	0.5	0.5	0.5	4.5	1.0	20	2.5	1.0	1.0	20	1.0
28	16:00	1.0	1.5	1.0	3.0	0.5	17	1.5	0.5	0.5	17	0.5
29	08:30	0.5	0.5	0.5	2.0	1.0	12	1.0	0.5	1.0	12	0.5
30	10:15	1.0	2.0	3.5	8.5	2.0	22	2.5	1.0	2.0	22	1.0

SPOT CHECKS ON METHANE CONCENTRATIONS
 (all concentrations in ppm unless otherwise noted)
 (Continued)

Date	Time	Block A					Block B				
		74	73	72	71	70	56	55	54	53	
May	1 10:45	0.5	1.5	3.5	14	1.5	20	2.5	1.0		
	1 15:00	2.0	2.5	4.0	12	2.5	28	3.5	2.0		
	1 19:40	1.5	2.5	30	14	2.5	25	3.0	2.0		
	2 09:00	2.0	4.5	12	45	4.5	20	4.0	4.0		
	2 15:00	1.5	3.5	6.5	18	2.5	16	3.5	2.0		
	3 09:00	1.5	2.0	2.5	8.0	3.0	6.0	4.0	2.0		
	3 11:00	Active pumping halted in Block A									
	3 15:00	1.5	2.0	1.0	10	1.5	14	2.0	1.0		
	3 20:15	8.0	3.5	5.0	36	-	-	-	-		
	4 09:30	22	9.0	28	160	2.5	40	5.0	2.0		
	5 09:00	100	125	7.3% LEL	9.2% LEL	5.0	50	6.5	5.0		
	5 10:00	Re-start pumping in Block A									
	6 10:00	0.5	1.0	2.0	4.0	1.5	18	3.0	1.5		
	7 16:15	1.5	1.5	1.5	2.5	1.5	8.0	2.0	1.5		
	7 18:00	Reduce suction in unit 71									
	8 08:30	1.5	2.0	2.0	3.0	2.0	12.0	2.5	2.0		
	12 15:00	3.0	4.5	4.0	10.0	6.0	40	7.0	5.0		
	13 09:00	3.0	3.5	3.0	7.5	5.5	35	6.0	4.0		
	20 12:00	-	-	-	7.0	-	38	-	-		
	23 18:00	1.0	1.5	1.5	5.0	-	30	-	-		
	23 18:00	Simulate fan failure on Block A									
	23 24:00	1.5	4.0	68	100	-	-	-	-		

SPOT CHECKS ON METHANE CONCENTRATIONS
 (all concentrations in ppm unless otherwise noted)
 (Continued)

		Unit #												
		Block C												
Date	Time	52	51	50	49	48	47	46	45	44				
March 21	12:30	1	2	1	4	26	0	2	3	3				
21	22:30	1	2	1	4	17	0.5	4	2	2				1.5
22	10:30	2	3	2	4	21	1	1	4	1				1
23	14:00	13	10	10	16	32	10	11	6	8				8
27	09:30	14	12	8	9	23	8	8	11	10				10
27	16:00	3.5	4	2	6	14	2	2	5	3				3
27	23:00	3	4	1	6	18	1	1	5	4				4
30	14:15	6	3	2	6	17	2	2	5	2				2
31	11:45	9	3	1	5	20	2	1	4	2				2
31	22:45	3	2	1	2.5	10	1	1	2	1				1
April 3	10:30	7	2	4	10	50	3	3	11	6				6
13	15:30	10	11	6.5	6.5	36	5	4.5	10	2				2
13	17:25													
14	17:45	2	2.5	2.0	4.5	6.5	1.5	1.5	2	2				2
14	23:45	4.0	4.5	4.0	12	10.0	3.0	4.0	5.5	3.0				3.0
15	10:30	5.5	6.0	6.0	11	11	6.5	4.5	6.0	5.0				5.0
17	17:00													
18	15:30	1	2.5	2	3.5	7	1.5	0.5	0.5	0.5				0.5
19	09:00	3.5	4	3	6.0	10	2.5	3	4.5	3.5				3.5
19	16:00	2	3	2.5	4.0	7.0	1.5	1.5	2.5	2.0				2.0
20	11:00	4.0	4.5	3.5	6.0	9.5	3.5	3.5	4.5	2.5				2.5

SPOT CHECKS ON METHANE CONCENTRATIONS
(all concentrations in ppm unless otherwise noted)
(Continued)

		Unit #										
		Block C										
Date	Time	52	51	50	49	48	47	46	45	44		
April 21	10:30	5	3	3	3.5	3	5	10	2	4.0		
21	17:00	1	2.5	1.5	3.5	6.5	1	1	3	2.0		
22	11:00	2	2.5	2.0	4	8	1.5	1.5	2.5	2.0		
24	15:00	Reduce suction in Block C										
25	11:30	2	2.5	2.0	6.5	10	2.5	2.0	4.5	3.0		
26	00:00	8	6.5	9.0	16	20	6.0	6.0	8.0	6.5		
27	09:30	2.5	3.0	3.0	11	14	2.5	2.0	5.0	2.5		
28	10:00	1.0	1.0	1.0	6.5	10	1.0	1.0	2.0	1.0		
28	16:00	0.0	1.0	0.5	4.5	7.0	0.0	0.5	2.0	1.0		
29	8:30	0.5	0.5	0.5	3.0	7.0	0.5	0.5	1.0	0.5		
30	10:15	1.0	1.5	1.0	7.0	10.0	0.5	0.5	3.0	1.0		
May 1	10:45	0.5	2.0	1.0	5.5	10.0	0.5	0.5	2.5	0.5		
1	13:00	Active pumping halted in Block C										
1	15:00	2.0	3.0	2.0	5.0	12	1.5	1.0	4.5	2.5		
1	19:40	1.5	3.0	2.5	5.0	18	1.5	2.0	5.5	3.0		
2	9:00	2.0	3.0	3.0	4.5	14	2.0	1.5	3.5	2.0		
2	15:00	2.0	4.0	2.0	4.5	14	2.0	1.5	4.0	2.0		
3	9:00	2.0	3.5	2.5	4.0	12	2.0	2.0	5.0	3.0		
3	15:00	0.5	1.5	1.0	3.0	12	1.0	1.5	3.5	1.0		
4	9:30	1.0	3.0	1.5	5.0	28	0.5	0.5	7.5	3.0		

SPOT CHECKS ON METHANE CONCENTRATIONS
 (all concentrations in ppm unless otherwise noted)
 (Continued)

		Unit #										
		Block C										
Date	Time	52	51	50	49	48	47	46	45	44		
May	5 9:00	3.0	6.0	3.0	7.5	30	2.5	3.0	9.0	5.0		
	6 10:00	3.5	2.0	1.5	3.0	13	1.5	1.0	3.5	1.5		
	7 16:15	1.5	2.0	1.5	2.0	7.0	1.5	2.0	2.5	1.5		
	8 08:30	2.5	3.0	4.0	4.5	11	2.5	2.5	3.0	3.0		
	11 09:00	Cover riser pipes										
	12 15:00	4.0	7.0	5.0	9.0	110	4.5	4.0	10	5.5		
	13 08:00	-	-	-	6.5	30	-	-	-	-		
	20 12:00	-	-	-	26	450	-	-	16	-		
	20 23:00	-	-	-	28	560	-	-	-	-		
	24 09:30	-	-	-	-	260	-	-	-	-		
	24 22:25	Reconnect riser pipes to vent system										
	25 12:30	-	-	-	-	30	-	-	-	-		
July	5 11:30	21	14	16	32	36	5.0	5.0	8.0	5.0		
	6 16:30	Active pressurization in Block C										
	7 10:30	280	10	10	180	14	3.5	2.5	4.5	2.5		
	8 10:00	240	220	14	150	10	2.0	2.0	2.5	2.0		
	10 9:00	160	100	5.5	110	10	2.5	1.5	3.5	1.5		
	14 9:00	1.0	65	1.5	35	9.5	1.5	1.0	2.0	1.0		
	19 15:30	5.5	50	6.5	38	14	7.0	6.5	7.0	8.0		
August	4 16:00	2.0	30	3.5	25	9.0	2.0	1.5	2.0	1.5		
	5 9:00	2.0	50	6.0	30	14	2.0	1.5	4.5	1.5		

SPOT CHECKS ON METHANE CONCENTRATIONS
 (all concentrations in ppm unless otherwise noted)
 (Continued)

Date	Time	Unit #							
		70	68	67	64	63	62	61	60
July 5	11:30	-	-	-	0.5	1.0	2.0	1.5	3.0
7	10:30	2.0	1.5	2.0	1.0	1.5	1.5	1.5	1.5
7	12:00								
8	10:00	2.0	3.0	2.5	1.0	1.0	1.0	1.0	1.0
10	09:00	1.5	2.0	2.5	1.5	1.5	1.0	1.0	1.0
14	09:00	4.5	2.0	15	-	1.5	1.5	1.0	1.0
19	15:30	8.0	7.0	14	5.0	5.5	5.5	5.0	5.0
August 4	16:00	2.0	2.0	5.0	2.0	3.0	2.0	2.0	2.5
5	09:00	4.0	3.0	6.5	3.0	2.0	2.0	1.5	2.0

APPENDIX A-2

SPOT CHECKS ON METHANE CONCENTRATIONS AT VENTS AND SOIL PROBES
(all concentrations in ppm unless otherwise noted)

Date	Time	Location																			
		V71F	V49F	V46F	V46R	M70R	M69F	M52F	M56R	M53S											
April	13	Start pumping in Block C																			
	14	17:25	150	6.0	8.3% LEL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	14	17:45	100	8.0	7.5% LEL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	14	23:45	120	8.5	6.4% LEL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	15	10:30																			
	17	17:00	Reduce suction in Block C																		
	18	15:00	Start pumping in Block A																		
	18	15:30	18% LEL	50	6.0	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	19	09:00	11% LEL	38	3.0	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	19	16:00	13% LEL	34	1.0	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	12:00	13% LEL	44	3.0	110	17% GAS	99% GAS	66% GAS	20% LEL	6.3% LEL	25% LEL	41% GAS	22% LEL	38% GAS	22% LEL	22% LEL	22% LEL	19% LEL	10% LEL	47% GAS	
21	10:30	10.2% LEL	35	3.0	110	65% LEL	94% GAS	95% GAS	50-2% LEL	22% LEL	22% LEL	48% GAS	70-2% LEL	48% GAS	70-1% LEL	41% GAS	60-1% LEL	52% GAS	57% GAS	55% GAS	
21	17:00	12% LEL	30	1.5	90	5% GAS	93% GAS	95% GAS	15-.5% LEL	12% LEL	12% LEL	56% GAS	43-1.8% LEL	56% GAS	33-1.5% LEL	5.7% LEL	37-1.0% LEL	11% LEL	11% LEL	57% GAS	
22	11:00	9.7% LEL	22	2.0	105	70% LEL	92% GAS	95% GAS	43-1.8% LEL	10% LEL	10% LEL	56% GAS	33-1.5% LEL	56% GAS	37-1.0% LEL	5.7% LEL	38-2.0% LEL	23% LEL	23% LEL	50% GAS	
24	15:00	Reduce suction in Block C																			
25	11:30	12% LEL	95	-	90	70% GAS	95% GAS	94% GAS	57-1% LEL	12% LEL	12% LEL	52% GAS	43-1.8% LEL	56% GAS	33-1.5% LEL	5.7% LEL	37-1.0% LEL	11% LEL	11% LEL	57% GAS	
26	00:00	14% LEL	100	-	100	64% GAS	95% GAS	95% GAS	20-3% LEL	60% LEL	60% LEL	55% GAS	15-.5% LEL	56% GAS	38-2.0% LEL	23% LEL	58-.3% LEL	7.0% LEL	7.0% LEL	58% GAS	
26	16:00	11% LEL	-	-	-	25% GAS	95% GAS	95% GAS	43-1.8% LEL	10% LEL	10% LEL	56% GAS	33-1.5% LEL	56% GAS	37-1.0% LEL	5.7% LEL	38-2.0% LEL	23% LEL	23% LEL	50% GAS	
27	09:30	10.1% LEL	100	-	100	58% GAS	95% GAS	95% GAS	43-1.8% LEL	10% LEL	10% LEL	56% GAS	33-1.5% LEL	56% GAS	37-1.0% LEL	5.7% LEL	38-2.0% LEL	23% LEL	23% LEL	50% GAS	
27	17:00	Add additional well in unit 71																			
28	08:00	9.3% LEL	86	-	90	15% GAS	94% GAS	94% GAS	33-1.5% LEL	5.7% LEL	5.7% LEL	56% GAS	40-.3% LEL	56% GAS	40-.3% LEL	13% LEL	40-.3% LEL	13% LEL	13% LEL	56% GAS	
28	16:00	12% LEL	70	-	85	51% GAS	95% GAS	95% GAS	37-1.0% LEL	11% LEL	11% LEL	57% GAS	33-1.5% LEL	56% GAS	37-1.0% LEL	5.7% LEL	38-2.0% LEL	23% LEL	23% LEL	50% GAS	
29	09:00	9.5% LEL	72	-	84	63% GAS	95% GAS	95% GAS	38-2.0% LEL	23% LEL	23% LEL	50% GAS	58-.3% LEL	58% GAS	58-.3% LEL	7.0% LEL	58-.3% LEL	7.0% LEL	7.0% LEL	58% GAS	
30	10:15	6.8% LEL	80	-	80	13% GAS	96% GAS	96% GAS	40-.3% LEL	13% LEL	13% LEL	56% GAS	40-.3% LEL	56% GAS	40-.3% LEL	13% LEL	40-.3% LEL	13% LEL	13% LEL	56% GAS	
1	10:45	8.4% LEL	82	-	65	24% LEL	96% GAS	96% GAS	40-.3% LEL	13% LEL	13% LEL	56% GAS	40-.3% LEL	56% GAS	40-.3% LEL	13% LEL	40-.3% LEL	13% LEL	13% LEL	56% GAS	
1	13:00	Active pumping halted in Block C																			
1	15:00	10.2% LEL	-	-	-	30% LEL	96% GAS	96% GAS	30-1% LEL	23% LEL	23% LEL	54% GAS	30-1% LEL	54% GAS	30-1% LEL	23% LEL	30-1% LEL	23% LEL	23% LEL	54% GAS	
1	19:40	12% LEL	-	-	-	39% GAS	92% GAS	92% GAS	34-4% LEL	30% LEL	30% LEL	56% GAS	30-1% LEL	56% GAS	30-1% LEL	23% LEL	30-1% LEL	23% LEL	23% LEL	54% GAS	
2	09:00	14% LEL	-	-	-	65% GAS	95% GAS	95% GAS	65-2% LEL	27% LEL	27% LEL	55% GAS	65-2% LEL	55% GAS	65-2% LEL	27% LEL	65-2% LEL	27% LEL	27% LEL	55% GAS	
3	09:00	7.3% LEL	-	-	-	27% GAS	92% GAS	92% GAS	65-0% LEL	23% LEL	23% LEL	56% GAS	65-0% LEL	56% GAS	65-0% LEL	23% LEL	65-0% LEL	23% LEL	23% LEL	56% GAS	
3	11:00	Active pumping halted in Block A																			

SPOT CHECKS ON METHANE CONCENTRATIONS AT VENTS AND SOIL PROBES
(all concentrations in ppm unless otherwise noted)
(Continued)

Date	Time	Location									
		V71F	V49F	V46F	V46R	M70R	M69F	M52F	M56R	M53S	
May 3	13:30	-	-	-	-	18% GAS	93% GAS	-	-	30% LEL	54% GAS
4	11:00	-	-	-	-	9% GAS	92% GAS	60-0% LEL	-	20% LEL	54% GAS
4	22:00	-	-	-	-	49% GAS	-	-	-	-	-
5	09:30	19% GAS	-	-	-	63% GAS	93% GAS	50-0% LEL	-	32% LEL	52% GAS
5	10:00	Re-start pumping in Block A	-	-	-	65% GAS	-	-	-	-	-
5	11:00	-	-	-	-	65% GAS	-	-	-	-	-
5	12:20	-	-	-	-	26% GAS	96% GAS	13% GAS - 2% LEL	-	42% LEL	59% GAS
6	10:00	8.6% LEL	-	-	-	-	-	-	-	-	-
6	11:00	8.7% LEL	-	-	-	-	-	-	-	-	-
6	22:00	9.1% LEL	-	-	-	24% GAS	-	-	-	-	-
7	11:00	Reduce suction in Block C	-	-	-	-	-	-	-	-	-
7	11:00	15% LEL	-	-	-	57% GAS	94% GAS	70-.8% LEL	-	40% LEL	55% GAS
7	16:15	12% LEL	-	-	-	60% GAS	-	-	-	-	-
7	17:30	14% LEL	-	-	-	65% GAS	-	-	-	-	-
7	18:00	Reduce suction in Unit 71	-	-	-	-	-	-	-	-	-
7	21:00	12% LEL	-	-	-	65% GAS	-	-	-	-	-
8	10:00	7.7% LEL	-	-	-	52% GAS	-	12% GAS	-	40% LEL	58% GAS
9	13:00	7.4% LEL	-	-	-	80% LEL	91% GAS	63% - 0% LEL	-	36% LEL	52% GAS
9	22:00	7.1% LEL	-	-	-	48% LEL	-	-	-	-	-
10	11:30	7.5% LEL	-	-	-	11% GAS	93% GAS	90% - 0% LEL	-	34% LEL	54% GAS
10	22:15	7.9% LEL	-	-	-	45% LEL	-	-	-	-	-
11	09:30	-	-	-	-	23% GAS	91% GAS	10% GAS - 0% LEL	-	34% LEL	55% GAS
11	11:45	12% LEL	-	-	-	34% GAS	-	-	-	-	-
11	20:30	10% LEL	-	-	-	50% GAS	-	-	-	-	-
12	08:30	14% LEL	-	-	-	61% GAS	91% GAS	13% GAS - 0% LEL	-	37% LEL	56% GAS
12	15:00	-	-	-	-	66% GAS	97% GAS	12% GAS - 0% LEL	-	42% LEL	56% GAS
13	09:00	6.8% LEL	-	-	-	25% GAS	92% GAS	13% GAS - 1.0% LEL	-	42% LEL	55% GAS
14	08:45	6.4% LEL	-	-	-	10% GAS	-	-	-	-	-
15	10:00	9.8% LEL	-	-	-	21% GAS	-	-	-	-	-
15	12:00	9.8% LEL	-	-	-	15% GAS	-	-	-	-	-
15	17:15	11% LEL	-	-	-	47% GAS	-	-	-	-	-
16	10:00	7.5% LEL	-	-	-	23% GAS	-	-	-	-	-

SPOT CHECKS ON METHANE CONCENTRATIONS AT VENTS AND SOIL PROBES
(all concentrations in ppm unless otherwise noted)
(Continued)

Date	Time	Location									
		V71F	V49F	V46F	V46R	M70R	M69F	M52F	M56R	M53S	
May 19	07:00	-	-	-	-	34% GAS	-	-	-	-	-
19	17:00	14% LEL	-	-	-	44% GAS	-	-	-	-	-
20	12:00	18% LEL	-	-	-	60% GAS	-	-	-	-	-
20	22:00	15% LEL	-	-	-	65% GAS	-	-	-	-	-
22	19:00	11% LEL	-	-	-	25% GAS	-	-	-	-	-
23	18:00	14% LEL	-	-	-	61% GAS	-	-	-	-	-
23	18:00	Simulate fan failure on Block A									
23	24:00	14% GAS	-	-	-	66% GAS	-	-	-	-	-
24	00:00	Start fan on Block A									
24	09:30	10% LEL	-	-	-	42% GAS	-	-	-	-	-
24	21:15	13% LEL	-	-	-	64% GAS	-	-	-	-	-
25	22:25	Simulate fan failure on Block A									
25	12:30	5% GAS	-	-	-	70% GAS	-	-	-	-	-
25	12:30	Start fan on Block A									
25	14:30	9.9% LEL	-	-	-	75% GAS	-	-	-	-	-
25	14:30	Simulate fan failure on Block A									
25	23:00	91% LEL	-	-	-	49% GAS	-	-	-	-	-
26	11:00	Start fan on Block A									

Note: 20-3% LEL indicates meter would increase to a measurement of 20% LEL and thereafter decline to a value of 3% LEL likely due to a limited volume of methane gas

APPENDIX A-3

SPOT CHECKS ON SUB-SLAB METHANE CONCENTRATIONS

		Block A						Block B		
		74	73	72	71	55				
Date	Time	A	B	A	B	A	B	A	B	
May	1 10:45	-	-	-	-	15-11	13-11	20-3	20-1	
	1 15:00	4-2	3-2	4-3	4	15	11	30	17	
	1 19:40	2.0	1.5	90	300	40	12	4.0	2.0	
	2 09:00	2.0	2.0	120	>1000	80	40	4.5	2.0	
	2 15:00	2.0	2.5	200	10% LEL	110	18	5.5	2.0	
	3 09:00	1.5	1.5	16	1.6% LEL	9	7	8.2	7-4	
	3 11:00	Active pumping halted in Block A								
	3 13:30	5-1	2	50	.2% LEL	560	7	9% GAS	8	
	4 09:30	80-20	40-24	150-30	70-0	4.3% LEL	70	33% GAS	100	
July	7 12:00	Activate pressurization in Block A								
	7 14:20	0% LEL	0% LEL	0% LEL	12% LEL	0.1% LEL	22% LEL	87% LEL	1.3% LEL	

Notes: All concentrations given in terms of ppm unless otherwise noted

3-2 indicates a concentration of 3 ppm was initially measured, but dropped due to either lack of gas flow through probe or a declining concentration.

SPOT CHECKS ON SUB-SLAB METHANE CONCENTRATIONS IN UNIT 71
(Continued)

Date	Time	Slab Probe													
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
May 2	09:00	80	40	30	25	75	20	7.1% LEL	15% GAS	10% GAS	38% LEL	30	100	20	16% GAS
3	09:00	9	7	6	5	20	3	18	1.1% LEL	100	13	8	4	8	10
3	11:00	Active pumping halted in Block A													
3	13:30	9% GAS	8	10	7	150	480	13% GAS	37% GAS	43% GAS	15% GAS	1.8% LEL	4	42	14
3	20:15	25% GAS	32	32	32	2.8% LEL	32	23% GAS	51% GAS	53% GAS	31% GAS	64% LEL	63% LEL	.5% LEL	24% LEL
4	09:00	33% GAS	100	.1% LEL	2.6% LEL	1.6% LEL	1.4% LEL	32% GAS	54% GAS	54% GAS	33% GAS	27% GAS	14% GAS	0.7% LEL	100% LEL
July 7	12:00	Activate pressurization in Block A													
7	14:20	87% LEL	.3% LEL	.3% LEL	1.3% LEL	-	-	1.8% LEL	3.3% LEL	5.9% LEL	1.3% LEL	64% LEL	8% GAS	15% LEL	7.1% LEL
7	16:00	91% LEL	-	-	-	-	-	-	-	-	0% LEL	73% LEL	98% LEL	11% LEL	0.7% LEL
14	9:00	17% LEL	-	-	-	-	-	0% LEL	0.6% LEL	0.3% LEL	0% LEL	1% LEL	6.3% LEL	0.9% LEL	0% LEL

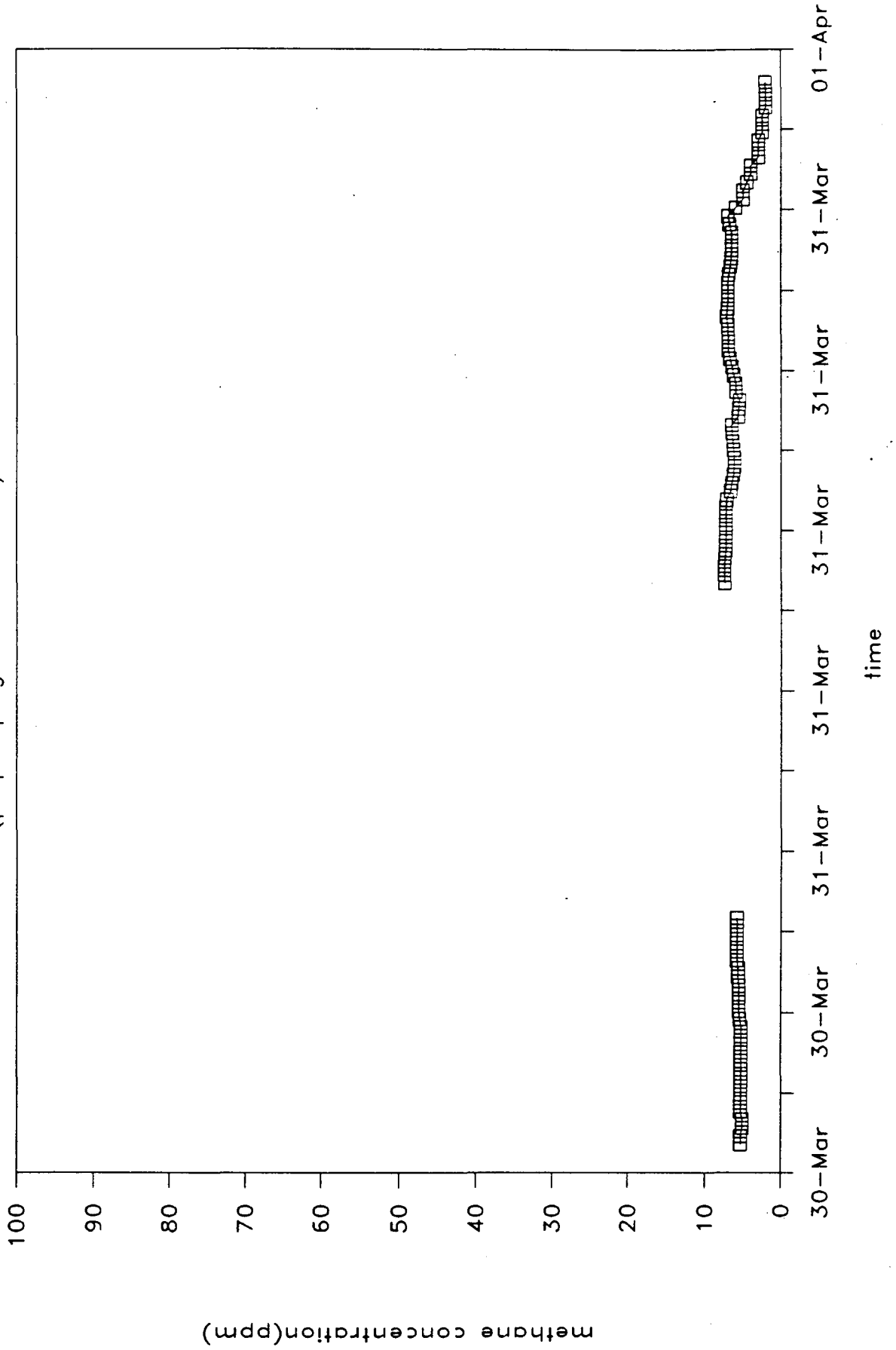
SPOT CHECKS ON SUB-SLAB METHANE CONCENTRATIONS
(Continued)

Date	Time	52		51		50		49		48		47		46		45		44		
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
May 1	10:45	0	0.5	4-0	1.5	2-1	2-1	5.5-0	5.5	9.0	9.5	0.5	0.5	0.5	1.0	2.5	2.5	2.5	7-2	0.5
1	13:00	Active pumping in Block C																		
1	15:00	3-1	7-2	5-4	3-2	8-2	8-2	2.5	5.5-7	6-2	30	4-2	2.5	3-1	1-0	6-2	4-3	6-1	4-3	6-4
1	19:40	2-0	5-1	5-0	2-0	10-1	7-1	5-1	5-1	18-1	20-4	2-1	1.5-1	2-0	2-0	6-1	6-1	-	3-4	4-1
2	09:00	3-0	7-0	6-0	3-0	10-5	7-5	3-0	3-5	10-1	12-1	3-1	2-1	3-0	1-0	2.5-0	4-0	-	7-3.5	3-1
2	15:00	1.5-0	5-0	3-0	5-0	8-5	4-0	4-0	5-0	1-0	6-0	2-5	1-0	1-0	1-0	5-0	5-0	3-0	5-3	2-0
3	09:00	1.5-0	5-1	3-1	3-1	8-2	5-1	4-0	4-2	12-0	12-1	2-1	2-1	2-1	2-1	5-1	5-1	5-0	5-4	3-1
3	13:30	.5-0	3-0	1-0	1-0	4-0	3-0	3-0	2-5	9-0	10-0	.5-0	.5-0	1-0	.5-0	3-0	2-0	3-0	3-1	1-0
4	09:30	1-0	6-0	3-0	4-0	10-0	5-0	5-0	5-1	28-0	28-0	1-0	1-0	.5-0	.5-0	8-0	8-0	8-0	7-4	3-2

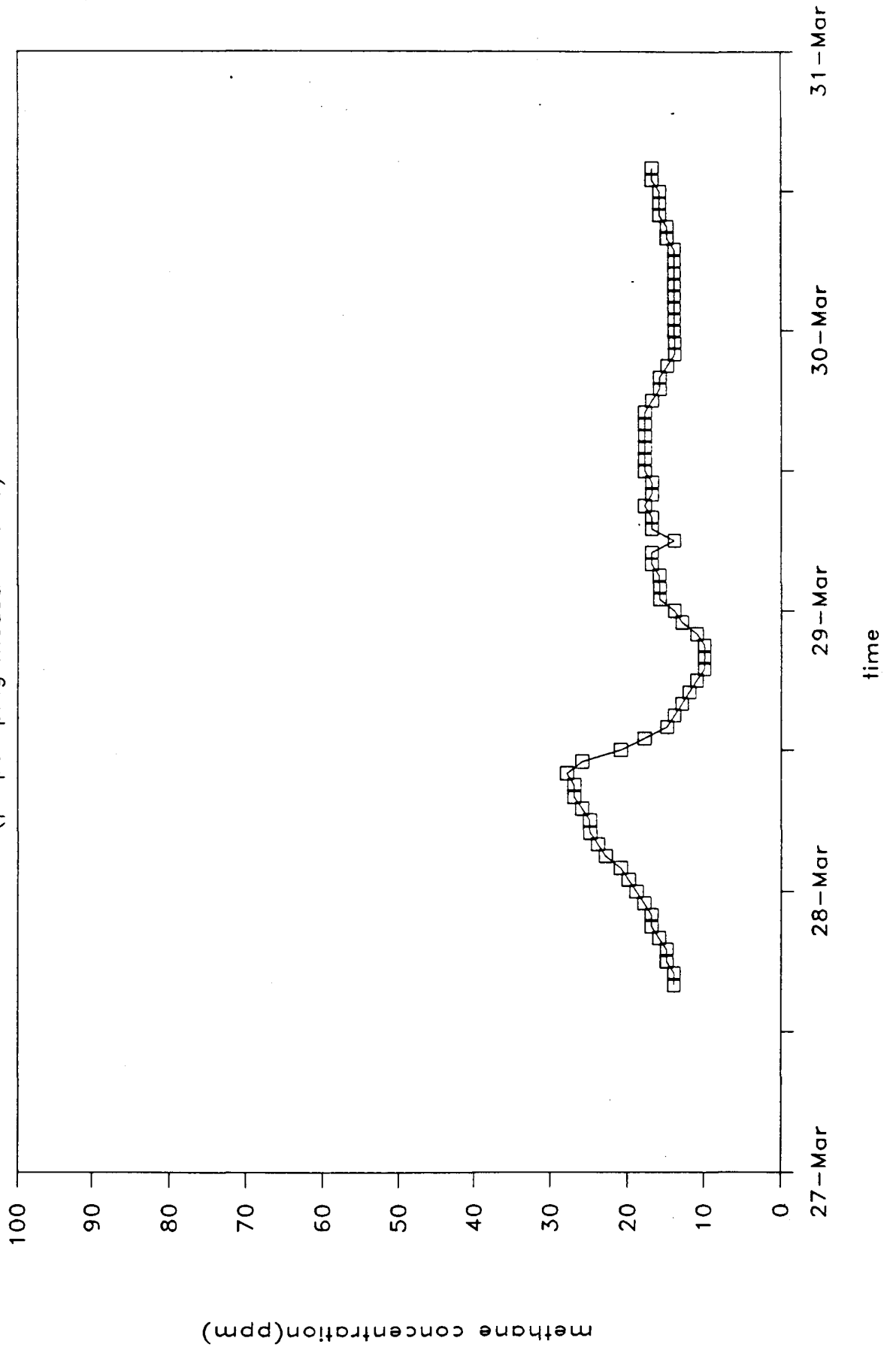
Notes: All concentrations given in term of ppm unless otherwise noted

3-2 indicates a concentration of 3 ppm was initially measured, but level dropped due to either lack of gas flow through probe or a declining concentration.

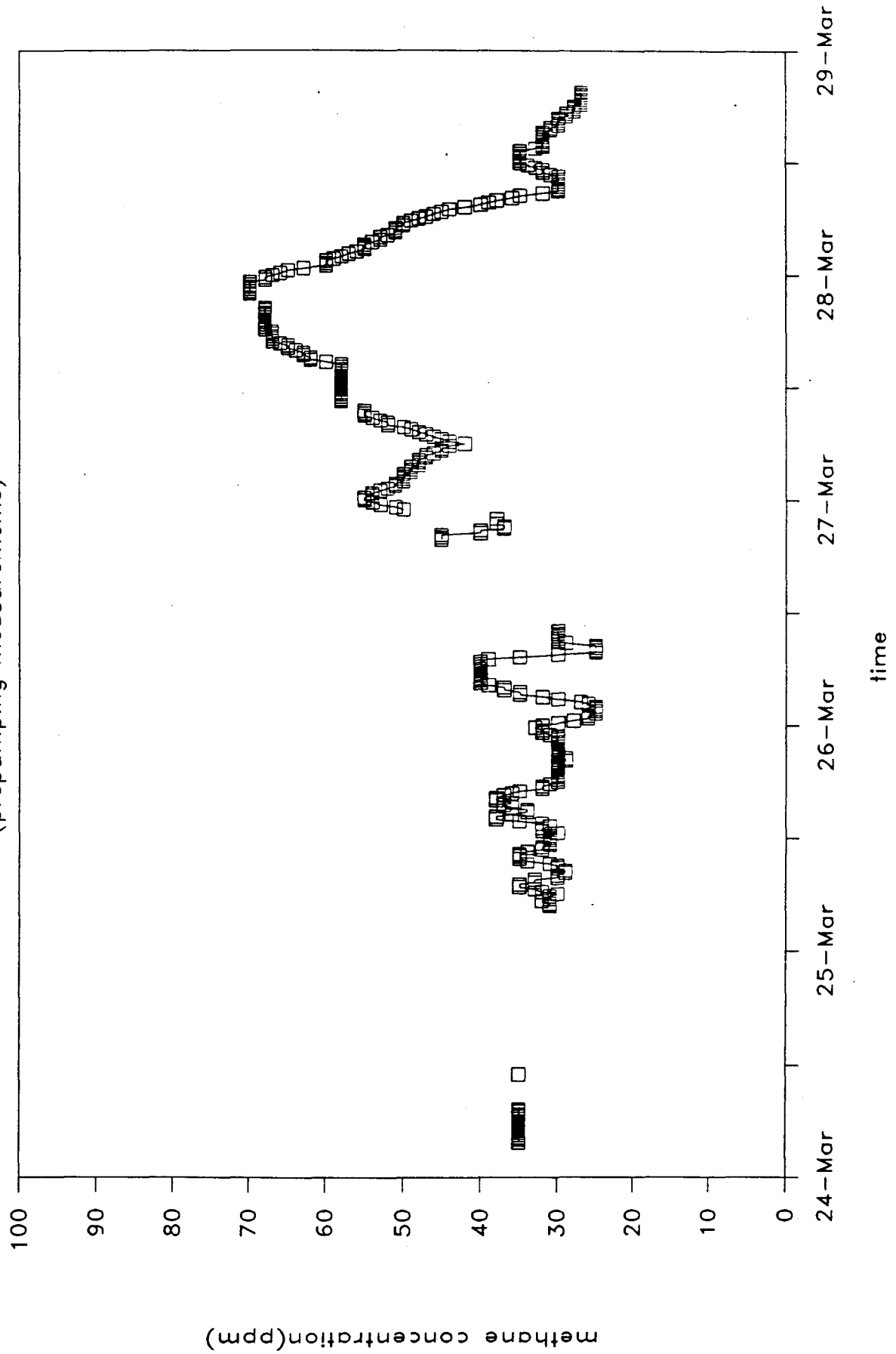
Continuous Monitoring Unit 45 (prepumping measurements)



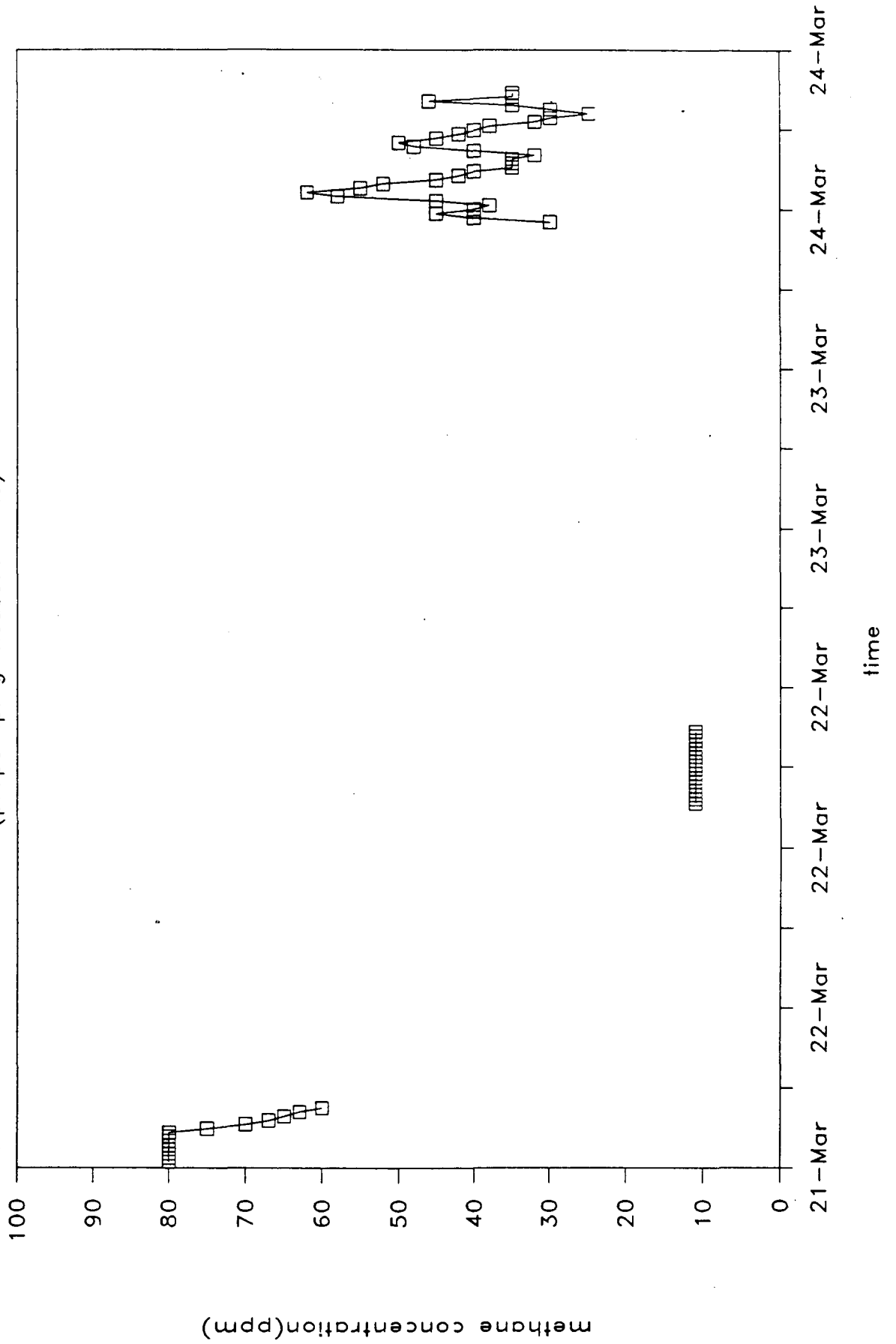
Continuous Monitoring Unit 48 (prepumping measurements)



Continuous Monitoring Unit 55 (prepumping measurements)

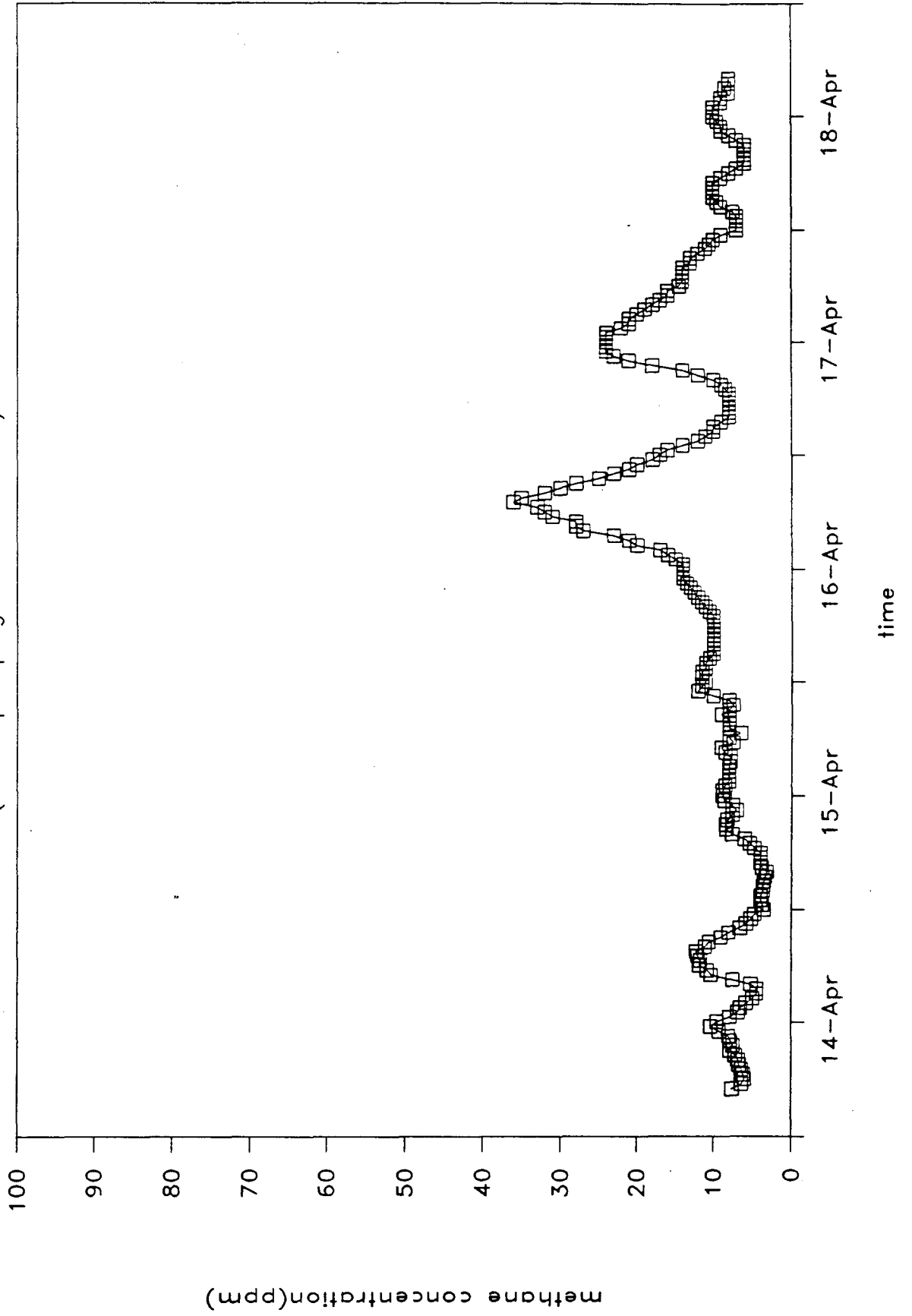


Continuous Monitoring Unit 72 (prepumping measurements)

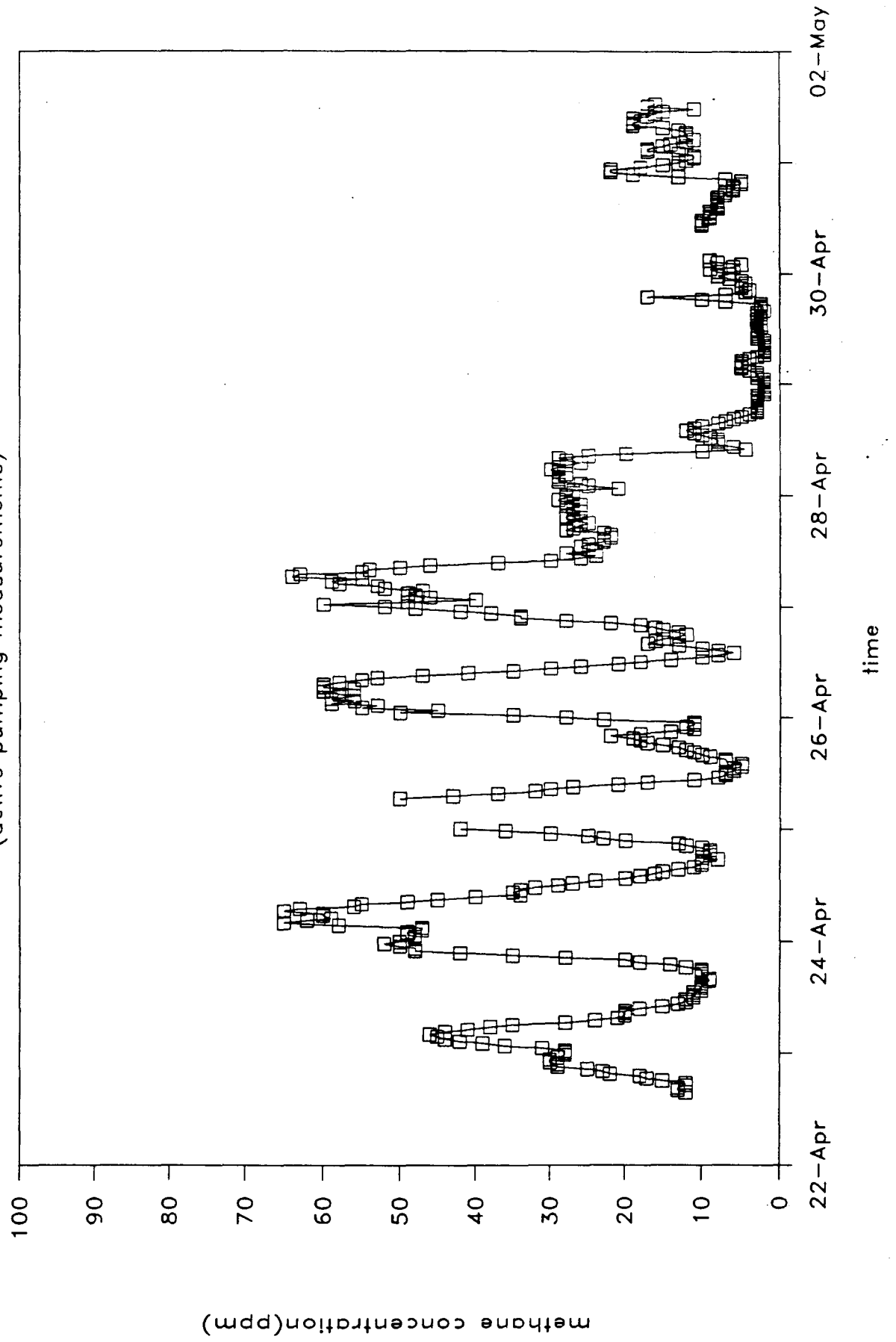


Continuous Monitoring Unit 48

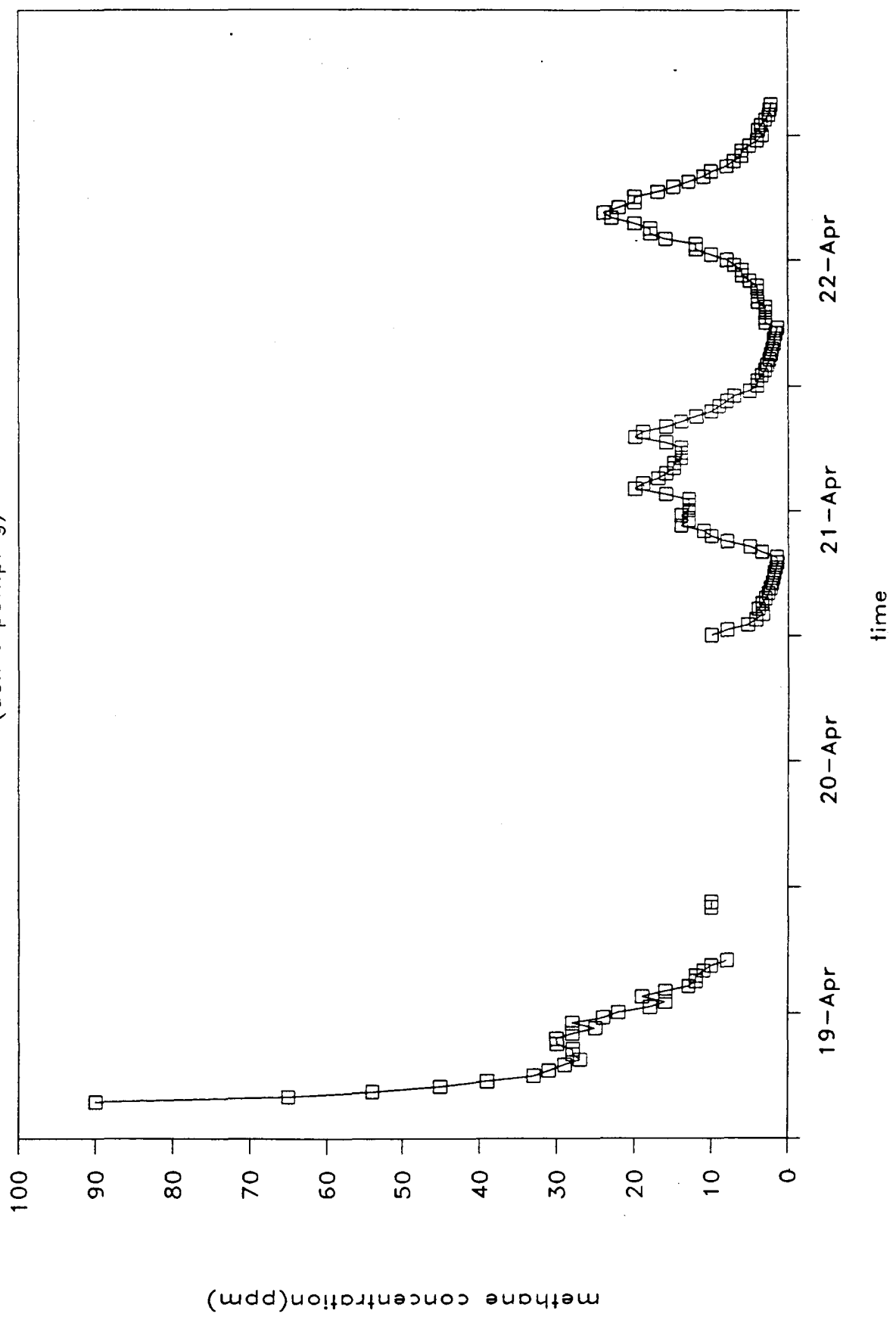
(active pumping measurements)



Continuous Monitoring Unit 71 (active pumping measurements)

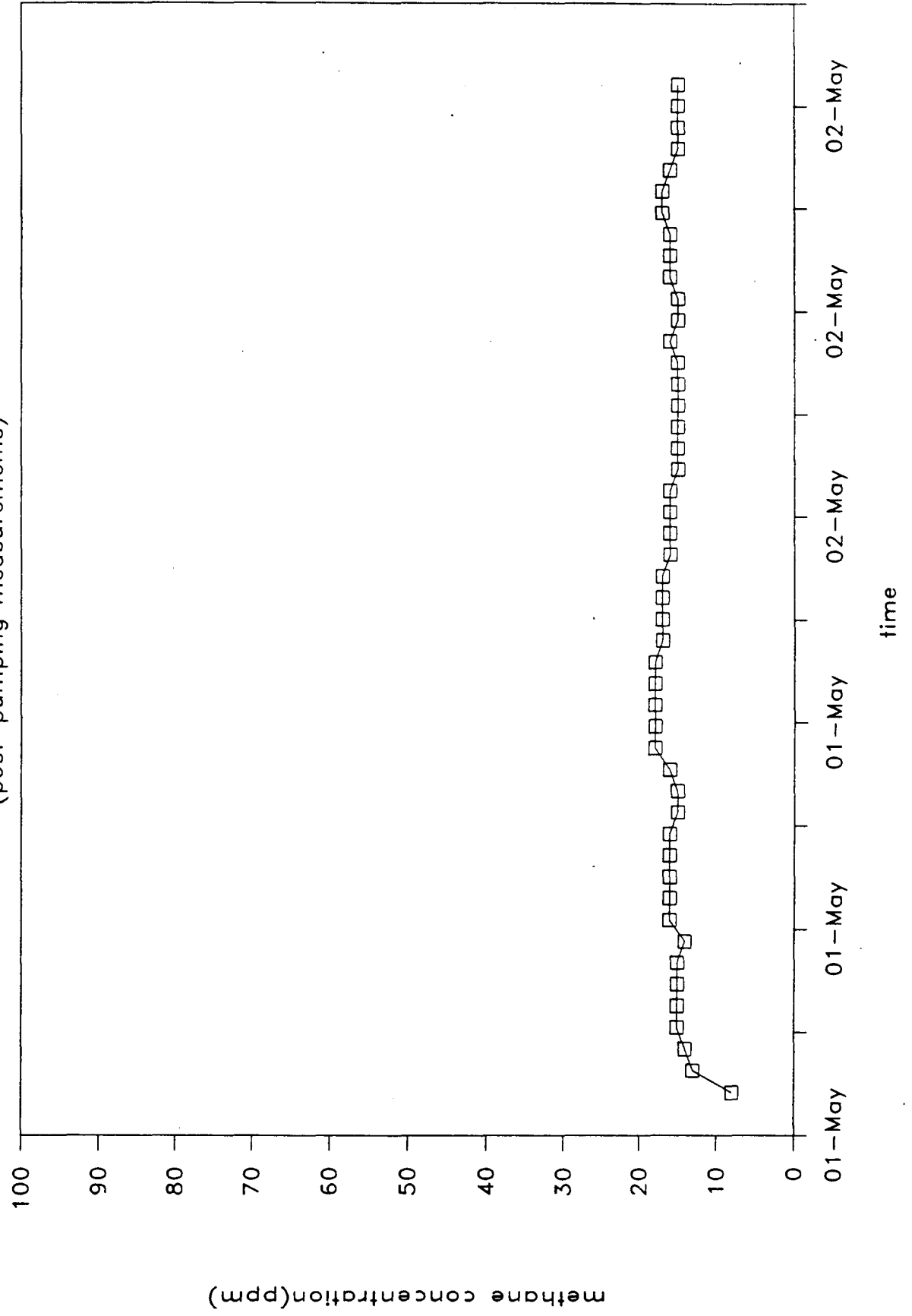


Continuous Monitoring Unit 72 (active pumping)

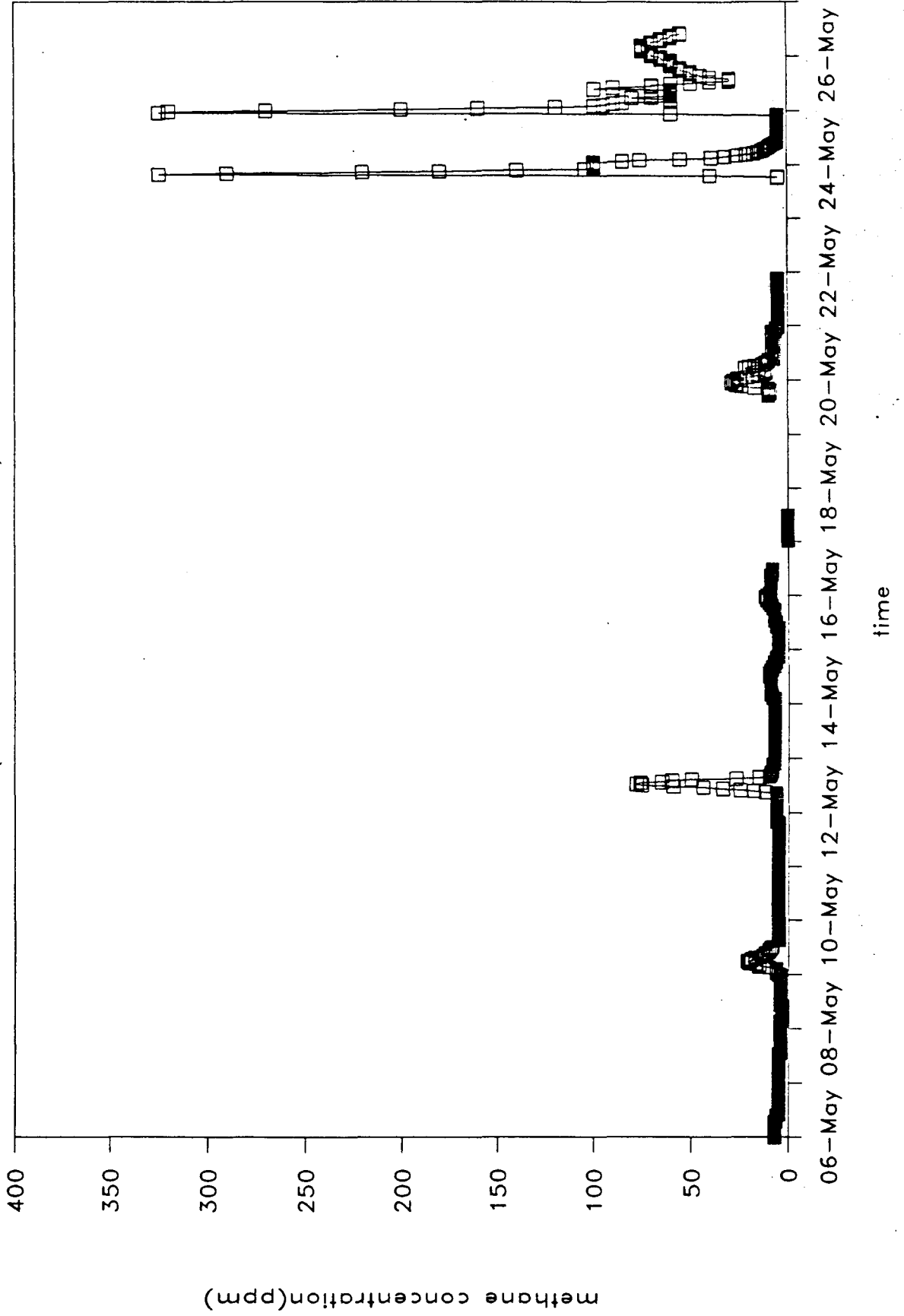


Continuous Monitoring Unit 48

(post-pumping measurements)



Continuous Monitoring Unit 71 (alternatives assessment)



APPENDIX A-5

SPOT CHECKS ON METHANE, CO₂ AND PRESSURE AT V71F AND M70R

V71F

M70R

Date	Time	Methane Conc.	CO ₂ Conc. (%)	CO ₂ /CH ₄	Pressure (Pa)	Methane Conc.	CO ₂ Conc. (%)	CO ₂ /CH ₄	Relative Humidity (%)	Flow rate (L/s)	Temp. (°C)
May 2	11:00	Active pumping halted in Block A									
3	14:30	18% GAS	-	-	-31.1	-	-	-	-	0	-
3	20:15	18% GAS	-	-	-38.6	-	-	-	-	0	-
4	09:00	9% GAS	-	-	-44.8	-	-	-	-	0	-
4	18:00	39% GAS	-	-	62.2	-	-	-	-	0	-
4	22:00	49% GAS	-	-	67.2	-	-	-	-	0	-
5	09:30	63% GAS	-	-	104.5	19% GAS	-	-	-	0	-
5	10:00	Restart pumping in Block A									
5	11:00	-	-	-	74.6	-	-	-	-	-	-
5	12:20	65% GAS	-	-	79.6	-	-	-	-	-	-
5	14:30	69% GAS	-	-	63.5	-	-	-	-	-	-
5	17:00	69% GAS	-	-	69.7	17% LEL	-	-	55.5	-	16.5
6	10:00	26% GAS	-	-	-62.2	8.6% LEL	-	-	41.2	-	20.2
6	11:00	-	-	-	-	8.7% LEL	-	-	33.5	-	24.0
6	22:00	24% GAS	-	-	-49.8	9.1% LEL	-	-	75.5	-	9.0
7	11:00	57% GAS	-	-	54.7	15% LEL	-	-	79.9	-	9.9
7	16:15	60% GAS	-	-	-22.4	12% LEL	-	-	81.1	-	5.9
7	17:30	65% GAS	-	-	31.1	14% LEL	-	-	81.2	-	5.9
7	18:00	Reduce suction in unit 71									
7	21:00	63% GAS	-	-	22.4	12% LEL	-	-	81.2	-	6.4
8	10:00	52% GAS	-	-	-42.3	7.7% LEL	-	-	80.0	-	9.5
8	20:00	19% GAS	-	-	-67.2	5.8% LEL	-	-	72.9	48	10.5
9	13:00	80% LEL	-	-	-25.9	7.4% LEL	-	-	47.9	42	18.1
9	22:00	48% LEL	-	-	-31.1	7.1% LEL	-	-	68.3	45	11.4
10	12:00	11% GAS	-	-	21.2	7.5% LEL	.13	.35	53.4	42	16.5
10	22:15	45% LEL	-	-	-30.6	7.9% LEL	-	-	71.3	-	11.3
11	09:30	23% GAS	-	-	21.2	-	-	-	48.8	50	18.5
11	11:45	34% GAS	-	-	34.8	12% LEL	-	-	-	-	-
11	20:30	50% GAS	-	-	89.6	10% LEL	-	-	-	42	-

SPOT CHECKS ON METHANE, CO₂ AND PRESSURE AT V71F AND M70R
(Continued)

V71F

M70R

Date	Time	Methane Conc.	CO ₂ Conc. (%)	CO ₂ /CH ₄	Pressure (Pa)	Methane Conc.	CO ₂ Conc. (%)	CO ₂ /CH ₄	Relative Humidity (%)	Flow rate (L/s)	Temp. (°C)
May 12	08:30	61% GAS	-	-	44.8	14% LEL	-	-	-	42	12.0
13	09:00	25% GAS	-	-	-53.5	6.8% LEL	-	-	-	-	-
14	08:45	10% GAS	-	-	-49.7	6.4% LEL	-	-	-	49	-
15	10:00	21% GAS	-	-	7.5	9.8% LEL	-	-	-	68	-
15	12:00	15% GAS	16	1.1	-	9.8% LEL	.13	.27	30	-	29.0
15	17:15	47% GAS	18	.38	33.6	11% LEL	.13	.27	62	42	18.0
16	10:00	23% GAS	18	.78	-31.1	7.5% LEL	.13	.35	38	45	26.0
19	07:00	34% GAS	19	.56	-3.7	-	.13	-	86	45	16.0
19	17:00	44% GAS	16	.36	57.2	14% LEL	.15	.21	44	42	24
20	12:00	60% GAS	16	.26	>62.2	18% LEL	.2	.22	60	45	20
20	22:00	65% GAS	-	-	58.5	15% LEL	-	-	-	42	-
22	19:00	25% GAS	15	.6	0	11% LEL	-	-	38	-	24
23	18:00	61% GAS	15	.25	49.8	14% LEL	-	-	-	-	14
23	18:00	Simulate fan failure on Block A									
23	24:00	66% GAS	-	-	43.5	14% GAS	-	-	-	-	-
24	00:00	Start fan on Block A									
24	09:30	42% GAS	-	-	-11.2	10% LEL	-	-	-	26	27
24	21:15	64% GAS	-	-	19.9	13% LEL	-	-	-	26	-
24	22:25	Simulate fan failure on Block A									
25	12:30	70% GAS	-	-	43.5	5% GAS	-	-	-	42	-
25	12:30	Start fan on Block A									
25	14:30	71% GAS	-	-	3.7	9.9% LEL	-	-	-	45	-
25	14:30	Simulate fan failure on Block A									
25	23:00	49% GAS	-	-	-14.9	91% LEL	-	-	-	86	-
26	12:00	Start Fan on Block A									
June 13	20:00	62% GAS	-	-	4.9	12% LEL	-	-	-	50	-
15	16:45	40% GAS	16	.40	13.6	11% LEL	-	-	-	-	-
23	11:00	38% GAS	19	.50	-14.9	7.4% LEL	.2	.54	-	42	-

SPOT CHECKS ON METHANE, CO₂ AND PRESSURE AT V71F AND M70R
(Continued)

V71F

M70R

Date	Time	M70R		V71F		Relative Humidity (%)	Flow rate (L/s)	Temp. (°C)			
		Methane Conc. (%)	CO ₂ Conc. (%)	Pressure (Pa)	Methane Conc. (%)				CO ₂ Conc. (%)		
July 4	12:40	40% LEL	18	9.0	-22.4	9.0% LEL	.15	.33	54	45	-
7	12:00	Start pressurization on Block A									
10	9:00	71% GAS	15	.21	-2.5	-	-	-	-	-	-
14	9:00	48% GAS	18	.375	-7.7	-	-	-	-	-	-

APPENDIX A-6

SPOT CHECKS ON SLAB PRESSURES
(all values in Pa)

Unit #

Date	Time	74		73		72		71		55	
		A	B	A	B	A	B	A	B	A	B
April 13	15:30	0	0	0	0	0	0	0	0	0	0
14	17:45	0	0	0	0	0	0	0	0	0	0
15	10:30	0	0	0	0	0	0	0	0	0	0
17	15:30	0	0	0	0	0	0	0	0	0	0
18	08:30	-	-	-	-	-	-	-	-	-	-
18	15:00	Start pumping in Block A									
18	15:30	-12.4	-7.5	-62.2	0	-43.5	-38.6	-6.0	-2.5	0	0
19	09:00	-11.7	-6.5	-62.2	-48.5	-34.8	-30.1	-6.2	-1.2	0	0
19	16:00	-11.7	-7.5	-74.7	-49.8	-35.3	-31.1	-6.2	-1.2	-	-
20	11:00	-11.2	-6.2	>-62.2	-48.5	-34.8	-29.1	-6.2	-1.2	0	0
21	10:00	-11.2	-6.7	-67.2	-46.0	-33.6	-28.6	-8.7	-3.5	0	0
22	11:00	-9.2	-5.2	-65.9	-45.3	-32.8	-27.9	-6.5	-1.7	0	0
25	11:30	-10.0	-5.7	-65.9	-44.8	-31.6	-27.1	-8.0	-3.0	0	0
27	09:30	-10.7	-6.5	-69.7	-48.0	-33.1	-28.6	-8.7	-3.5	0	0
27	17:00	Add additional well on unit 71									
28	08:00	-8.5	-4.0	-58.7	-38.3	-27.4	-22.6	-25.6	-37.3	0	0

APPENDIX A-6

SPOT CHECKS ON SLAB PRESSURES
(all values in Pa)

Unit #

Date	Time	74		73		72		71		55	
		A	B	A	B	A	B	A	B	A	B
May	1 10:45	-8.0	-4.2	-61.0	-39.0	-26.1	-22.4	-23.6	-35.3	0	0
	1 15:00	-10.2	-9.5	-61.0	-40.1	-39.7	-26.6	-24.9	-36.1	0	0
	2 09:00	-8.2	-5.0	-62.2	-39.8	-26.4	-22.4	-24.9	-36.8	0	0
	3 09:00	-7.7	-4.2	-61.0	-38.6	-24.9	-21.1	-24.9	-35.6	0	0
	3 11:00	Active pumping halted on Block A									
	3 11:00	0	0	0	0	0	0	0	0	0	0
	5 10:00	Re-start pumping in Block A									
	5 14:30	-10.0	-6.2	-51.3	-34.3	-23.9	-20.2	-22.4	-34.3	0	0
	7 18:00	Reduce suction in unit 71									
	8 08:30	-9.2	-6.2	-53.5	-34.8	-19.4	-23.4	-14.9	-21.9	0	0

Notes: negative values indicate that gradient is directed downward
 >-62.2 indicates value is at greater negative pressure than can be measured by inclined manometer
 - indicates no measurement was taken
 -0+ indicates a slight positive pressure however difficult to quantify

APPENDIX A-7

SPOT CHECKS ON SLAB AND WALL PRESSURES IN UNIT #71

Date	Time	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	
April	13 15:30	0.0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	14 17:45	0.0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	15 10:30	0.0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	17 15:30	0.0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	18 15:00	Start pumping on Block A																				
	18 15:30	-7.0	-2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	19 09:00	-6.2	-1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	19 16:00	-6.2	-1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	20 11:00	-6.2	-1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	21 10:00	-8.7	-3.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	22 11:00	-6.5	-1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	25 11:30	-8.0	-3.0	-2.7	-4.5	-2.5	-6.5	-3.7	-6.5	-10.5	-15.9	-9.0	-7.0	-9.5	-11.4	-	-	-	-	-	-	
	27 09:30	-8.7	-3.5	-2.5	-3.7	-2.5	-4.0	-4.5	-7.2	-12.4	-17.4	10.2	-3.2	-8.7	-13.7	-	-	-	-	-	-	
	27 13:35	-6.2	-1.5	-1.7	-3.7	-3.0	0.0	-2.5	-4.5	-7.5	-11.2	7.5	-6.0	-6.2	-10.0	-	-	-	-	-	-	
	27 14:00	Add additional well in unit 71																				
	28 08:00	-25.6	-37.3	-40.3	-34.8	-41.1	-14.2	-36.6	-30.0	-28.6	-30.0	-22.9	-12.4	-17.9	-22.4	-	-	-	-	-	-	
May	1 10:45	-23.6	-35.3	-36.8	-23.6	-34.8	0.0	-26.1	-26.1	-27.4	-29.1	-19.9	-19.9	-16.9	-21.4	-	-	-	-	-	-	
	1 15:00	-24.9	-36.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	2 09:00	-26.4	36.8	-39.8	-5.0	-33.1	-11.2	-33.1	-13.7	-20.2	-29.9	-23.6	-10.0	-16.7	-22.4	-	-	-	-	-	-	
	3 09:00	-24.9	-35.6	-40.1	-34.8	-32.3	-10.7	-36.1	-29.4	-28.1	-31.1	24.4	-21.2	-18.9	-22.9	-	-	-	-	-	-	
	3 11:00	Active pumping halted on Block A																				
	5 09:00	-	-	-	-	-	-	-1.2	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	
	5 10:00	Restart pumping on Block A																				
	5 14:30	-22.4	-34.3	-37.8	-31.9	-29.4	-7.5	-34.8	-27.9	-28.9	-30.1	-21.2	-20.4	-18.2	21.2	-1.2	-1.7	0.0	-0.5	-13.7	-0.5	
	7 18:00	Reduce suction in unit 71																				
	8 08:30	-14.9	-21.9	-24.4	-20.4	-10.0	-4.5	-22.4	-16.7	-16.2	-17.7	-13.2	-11.9	10.0	-16.2	-0.5	0.0	0.0	0.0	0.0	0.0	
July	7 12:00	Activate Pressurization on Block A																				
	27 10:00	3.48	44.8	45.8	40.6	40.6	21.2	46.0	40.6	39.8	41.6	34.1	28.4	30.4	36.1	3.7	6.2	2.5	2.5	30.4	2.5	

Notes: negative values indicate that gradient is directed downward
 - indicates no measurement taken
 - O, P, Q, R, S, T are wall probes

APPENDIX A-8

SPOT CHECKS ON SLAB AND WALL PRESSURES IN MEDIUM ROW (Pa)

UNIT #

Date	Time	49					45								
		A	B	C	D	A	B	C	D	E					
April 19	08:00	-0.7	-0.7	-	-	-17.4	-27.6	-	-	-27.4	-29.9	-23.6	-	-	
20	11:00	-1.5	-1.7	-	-	-17.4	-28.6	-	-	-27.4	-32.8	-23.6	-	-	
21	10:00	-1.0	-1.5	-	-	-16.2	-27.4	-	-	-27.4	-30.4	-24.9	-	-	
22	11:00	-1.0	-1.0	-	-	-16.2	-27.4	-	-	-26.9	-30.4	-26.1	-	-	
24	15:00	Reduce suction on Block C													
25	11:30	-2.7	-2.5	-	-	-14.9	-21.2	-	-	-21.2	-22.9	-29.8	-	-	
27	09:30	-2.5	-2.5	-	-	-16.9	-22.4	-	-	-21.9	-24.9	-21.2	-	-	
28	08:00	-3.5	-3.5	-	-	-16.4	-21.2	-	-	-20.2	-24.9	-19.9	-	-	
May 1	10:45	-2.7	-1.7	-	-	-14.9	-21.2	-	-	-23.6	-26.1	-22.4	-	-	
1	13:00	Active pumping halted on Block C													
1	15:00	0.0	0.0	-	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	
2	09:00	0.0	0.0	-	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	
3	09:00	0.0	0.0	-	-	0.0	0.0	-	-	0.0	0.0	9.0	-	-	
5	09:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	10:00	Pumping initiated for one hour only on Block C													
5	10:30	-1.2	-2.0	-89.6	-37.3	-15.9	-22.4	-43.5	-55.5	-20.7	-23.8	-19.9	13.9	0.0	
8	08:30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Note: C,D are wall probes in units 49 and 48
 D,E are wall probes in unit 45

APPENDIX A-9

SPOT CHECKS ON VENT PRESSURES DURING ACTIVE PUMPING PHASE

Date	Time	V71F	V52F	V52R	V49F	V49R	V46F	V46R	V44F	V44R	
April 13	15:30	0	0	0	0	0	0	0	0	0	
13	17:25	Start pumping on Block C									
14	17:45	0	>-62.2	>-62.2	31 L/s	>-62.2	32 L/s	24 L/s	>-62.2	>-62.2	
15	10:30	0	>-62.2	>-62.2	29 L/s	>-62.2	31 L/s	20 L/s	>-62.2	>-62.2	
17	15:30	0	-74.7	-243.9	29 L/s	-273.7	31 L/s	20 L/s	-148.3	-243.9	
17	17:00	Reduce suction on Block C									
17	17:10	0	-49.8	-124.4	-	-136.9	-	-	-49.8	-136.9	
18	08:40	0	-43.5	>-62.2	27 L/s	>-62.2	<10 L/s	10 L/s	-46.0	>-62.2	
18	15:00	Start pumping on Block A									
19	09:00	59 L/s	-38.6	-124.4	24 L/s	-119.4	24 L/s	48 L/s	-42.3	-129.4	
20	11:00	59 L/s	-39.8	>-62.2	24 L/s	>-62.2	12 L/s	12 L/s	-44.0	>-62.2	
21	10:00	66 L/s	-41.8	-124.4	24 L/s	-124.4	12 L/s	10 L/s	-46.0	-124.4	
22	11:00	44 L/s	-39.8	-119.4	20 L/s	-119.4	<10 L/s	<10 L/s	-44.8	-124.4	
24	15:00	Reduce suction on Block C									
25	11:30	72 L/s	-63.4	-74.7	-	-77.1	-42.3	62 L/s	-32.3	-32.3	
27	09:30	47 L/s	-64.7	-79.6	40 L/s	-79.6	-47.3	10 L/s	-36.0	-36.0	
27	17:00	Add additional well in unit 71									
28	08:00	76 L/s	-63.5	-79.6	34 L/s	-79.6	-43.5	10 L/s	-36.1	-36.1	
1	10:45	54 L/s	-64.7	-79.6	29 L/s	-79.6	-43.0	15 L/s	-37.3	-37.3	
1	13:00	Active pumping halted on Block C									
2	09:00	48 L/s	0	0	0	0	0	0	0	0	
3	09:00	50 L/s	-	-	-	-	-	-	-	-	
3	11:00	Active pumping halted on Block A									

Notes: - indicates measurement was not taken
 All values are in Pa unless indicated otherwise
 >-62.2 indicates pressure is less negative than range of inclined manometer
 <10 L/s indicates flow rate is beyond range of air flow measuring device
 Negative pressure indicates pressure is less than atmosphere

APPENDIX A-10

SPOT CHECKS ON CARBON MONOXIDE CONCENTRATIONS
(all concentrations in ppm)

Date	Time	Unit #									
		Block A					Block B				
		74	73	72	71	56	55	54	53		
April 25	11:30	0	1	1	0	1	1	1	1		
27	09:30	1	1	1	0	1	1	1	1		
28	08:00	0	2	0	0	0	0	1	0		
28	16:00	0	0	0	0	0	0	0	0		
29	09:00	0	0	0	0	0	0	0	0		
30	10:15	0	0	0	0	0	0	0	0		
1	10:45	0	0	0	0	0	0	0	0		
1	19:40	0	0	0	0	0	0	0	0		
2	09:00	0	0	0	0	0	0	0	0		
2	15:00	1	1	1	0	1	1	0	0		
3	09:00	0	2	0	0	0	0	0	0		
3	13:30	0	0	0	0	0	0	0	0		
4	09:30	1	0	0	0	0	0	0	0		
5	09:00	0	0	0	0	0	0	0	0		

SPOT CHECKS ON CARBON MONOXIDE CONCENTRATIONS
 (all concentrations in ppm)
 (Continued)

		Unit											Fan Location					
		Block C											V71F	V49F	V46R			
Date	Time	52	51	50	49	48	47	46	45	44	1	2	1	0	0	0	0	0
April 25	11:30	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
April 27	09:30	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
April 28	08:00	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April 28	16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April 29	09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April 30	10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May 1	10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May 1	19:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May 2	09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May 2	15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May 3	09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May 3	13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May 4	09:30	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
May 5	09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX A-11

CLIMATIC DATA

Date (1989)	Temperature		Precipitation			Wind		Field Observations
	High (°C)	Low (°C)	Rain (mm)	Snow (cm)	Total (mm)	Average Speed (km/h)	Prevailing Direction	
March 20	0.6	-7.5	-	4.2	5.2	8.0	SE	
21	-3.0	-12.0	-	Trace	Trace	15.0	NNW	
22	-1.0	-16.0	-	-	-	4.3	SSE	cool, snow flurries
23	4.0	-12.0	-	-	-	7.7	E	sunny, melting conditions
24	5.0	-4.0	Trace	-	Trace	7.2	E	warm considerable melting
25	9.0	0.0	-	-	-	8.9	Several	warm, sunny, all snow melted
26	10.1	-2.5	-	-	-	8.8	ESE	warm and sunny
27	20.7	-1.0	-	-	-	13.8	SSW	warm and humid
28	20.0	12.0	8.0	-	8.0	23.0	SW	drizzle and rain
29	12.0	-0.5	-	-	-	15.3	Several	overcast, cooler temperature
30	4.8	-0.5	0.2	-	0.2	11.8	E	overcast, cooler temperature
31	2.9	0.0	-	Trace	Trace	13.0	NW	overcast, cooler temperature
April 1	6.0	-1.5	-	-	-	15.6	WNW	moderate temperature, sunny
2	8.6	-1.6	3.6	Trace	3.6	16.7	SSW	moderate temperature, sunny

CLIMATIC DATA
(Continued)

Date (1989)	Temperature		Precipitation			Wind		Field Observations
	High (°C)	Low (°C)	Rain (mm)	Snow (cm)	Total (mm)	Average Speed (km/h)	Prevailing Direction	
April 3	8.5	4.2	7.6	-	7.6	9.9	SE/SSE	rain in morning
4	11.4	4.0	6.0	-	6.0	16.4	Several	rainy and overcast
5	7.4	3.0	1.0	-	1.0	13.0	WSW	overcast
6	4.4	1.0	1.3	-	1.3	14.4	WNW	slight snow flurry
7	5.4	-2.5	0	Trace	Trace	14.0	W/NNW	partly cloudy, cold
8	6.1	-3.9	-	-	-	3.0	SE	warm and sunny
9	1.5	-5.0	-	2.0	2.5	12.9	WNW	
10	0.0	-7.0	-	2.0	2.5	21.4	W	
11	3.0	-4.9	-	1.2	1.5	8.0	WNW	
12	4.8	-3.1	2.2	2.2	2.7	15.5	SSE	wet snow, overcast
13	4.0	-1.5	0	Trace	Trace	11.0	WNW	wet snow in morning, overcast
14	10.3	-1.9	7.4	-	7.4	16.0	S	mild temperature, sunny, heavy rain @ 22:00
15	10.0	-1.0	0.2	-	0.2	8.3	NW	mild temperature, sunny, rain in morning

CLIMATIC DATA
(Continued)

Date (1989)	Temperature		Precipitation			Wind		Field Observations
	High (°C)	Low (°C)	Rain (mm)	Snow (cm)	Total (mm)	Average Speed (km/h)	Prevailing Direction	
April 16	16.1	-2.6	-	-	-	8.6	SW/SSW	sunny, mild temperature
17	12.0	1.5	3.8	-	3.8	16.3	S/SSW	overcast, showers
18	5.1	-2.1	-	-	-	9.8	NNW/WNW	overcast, cool temperature
19	10.0	-3.6	-	-	-	12.2	W	sunny, mild temperature
20	14.6	-3.2	-	-	-	10.0	NW	partly cloudy, mild temperatures
21	12.2	0.0	-	-	-	12.6	NNW	clear, sunny, mild temperatures
22	6.5	-2.1	-	-	-	13.5	N	sunny, cool, clear
23	9.7	-4.5	-	-	-	11.8	N	sunny, cool temperatures
24	14.0	-3.2	-	-	-	8.3	WNW	sunny, mild temperatures
25	19.0	5.5	0.2	-	0.2	6.6	E	sunny, rain in early morning
26	19.2	6.0	1.4	-	1.4	6.9	NW	warm and sunny, rain in early morning
27	14.5	4.0	-	-	-	9.1	N	overcast, mild temperatures

CLIMATIC DATA
(Continued)

Date (1989)	Temperature		Precipitation			Wind		Field Observations
	High (°C)	Low (°C)	Rain (mm)	Snow (cm)	Total (mm)	Average Speed (km/h)	Prevailing Direction	
April 28	11.0	-1.0	Trace	-	Trace	8.6	E	clear, sunny in morning, drizzle in afternoon
29	10.0	4.5	9.4	-	9.4	14.8	E	overcast, rain in afternoon
30	14.5	5.8	-	-	-	7.5	W	overcast, sunny in afternoon
May 1	11.0	4.3	0.8	-	0.8	7.7	Several	overcast, mild temperatures
2	9.9	4.0	6.7	-	6.7	13.8	NWN/N	intermittent rainfall, cool temperatures
3	12.5	2.5	-	-	-	15.8	WNW	partly cloudy, mild tempera- ture, sunny in afternoon
4	18.5	0.1	-	-	-	9.5	Several	clear sunny, mild temperatures
May 5	15.5	7.6	7.4	-	7.4	15.8	SSW	rain @ 02:00-08:00 occa- sional drizzle all day, rain at 20:00-22:00
6	11.2	2.5	-	-	-	16.0	NNW	sunny, clear, in am, cold, cloudy in pm
7	3.7	0.5	0.2	1.4	2.0	22.3	NW	cool, overcast, snow flur- ries in afternoon

CLIMATIC DATA
(Continued)

Date (1989)	Temperature		Precipitation			Wind		Field Observations
	High (°C)	Low (°C)	Rain (mm)	Snow (cm)	Total (mm)	Average Speed (km/h)	Prevailing Direction	
May 8	9.1	2.5	0.2	-	0.2	12.5	NW	sunny, windy
9	15.7	0.9	-	-	-	6.6	E	sunny, partly cloudy
10	13.3	5.3	0.2	-	0.2	11.3	NE/NNE	sunny and cloudy periods, drizzle from 15:00 - 22:00
11	11.5	3.0	5.2	-	5.2	18.5	N	overcast, rain at 15:00 - all night
12	11.1	8.0	12.0	-	12.0	8.5	NNE	raining in morning, intense rain at 8:30, rain stops at 13:00
13	14.1	6.5	-	-	-	12.8	E	sunny, few clouds
14	15.6	5.0	Trace	-	Trace	6.7	E	mainly sunny, few clouds
15	18.1	2.5	-	-	-	4.6	E/ESE	mainly sunny, few clouds
16	22.5	9.6	Trace	-	Trace	7.2	Several	mainly sunny
17	25.6	8.5	-	-	-	5.3	Several	sunny, warm
May 18	27.0	9.5	-	-	-	4.0	Several	sunny, warm
19	26.5	11.7	-	-	-	7.5	SSW/SW	overcast

CLIMATIC DATA
(Continued)

Date (1989)	Temperature		Precipitation			Wind		Field Observations
	High (°C)	Low (°C)	Rain (mm)	Snow (cm)	Total (mm)	Average Speed (km/h)	Prevailing Direction	
20	20.0	12.5	7.6	-	7.6	11.1	S/SSW	rain in early morning, intense rain from 10:30 - 12:30
21	22.0	10.0	-	-	-	19.7	W/WNW	warm, sunny
22	22.5	7.2	-	-	-	8.0	WNW	warm, sunny
23	17.5	10.1	4.6	-	4.6	9.3	ENE	overcast, rain at 16:00- 21:00
24	23.2	8.5	-	-	-	8.8	S/SW	warm, sunny
25	26.0	12.5	6.4	-	6.4	9.6	Several	rain in morning
26	-	-	10.0	-	10.0	-	-	rain in early morning

Source: Environment Canada, K-W weather station
Field observations performed by field staff.

SITE BAROMETRIC PRESSURE
(Continued)

<u>Date</u>	<u>Time</u>	<u>Pa</u>
May 8	20:00	97.4
9	13:00	97.5
9	22:00	97.7
10	11:50	97.7
10	22:15	97.8
11	09:30	97.7
11	11:45	97.5
11	20:30	97.2
12	08:30	96.9
13	09:00	97.4
14	08:45	97.5
15	10:00	97.5
15	12:00	97.5
15	17:00	97.4
16	10:00	97.5
19	07:00	98.1
19	17:00	97.8
20	12:00	97.2
20	22:00	96.9
22	19:00	97.3
23	18:00	97.2
24	09:30	97.2
24	21:15	97.0
25	12:30	96.6

APPENDIX A-12
SITE BAROMETRIC PRESSURE

Date	Time	Pa
April 17	17:10	97.1
18	15:30	97.7
19	16:00	97.8
20	11:00	98.1
21	10:00	98.1
22	11:00	98.1
23	10:00	97.5
24	11:00	97.9
24	17:00	97.5
25	10:00	97.5
25	14:00	97.3
25	16:00	97.3
25	18:00	97.2
26	16:00	97.4
27	11:30	97.4
28	08:00	97.5
28	11:40	97.5
30	10:15	97.7
May 1	10:45	98.1
2	09:00	97.2
2	15:00	97.5
3	09:00	97.7
4	09:00	97.8
4	11:00	97.9
4	18:00	97.5
5	09:00	96.6
5	12:00	96.8
5	14:31	96.6
6	10:00	97.0
6	22:00	97.5
7	11:00	96.9
7	16:15	96.8
7	21:00	96.8
8	08:30	97.0
8	09:45	97.0

APPENDIX A-13

DESCRIPTION OF GEOLOGIC MATERIAL IN TRENCHES AND VAPOUR EXTRACTION WELLS

Trenches

- Trench T1: - mainly sand, little silt, loose
- slightly moist
- gravel around vent pipe
- Trench T2: - sandy silt material, loose
- very moist, increasing water content with depth
- gravel around vent pipe however pipe still contains much silt
- Trench T3: - sandy silt material, loose
- very moist
- gravel around vent pipe however pipe is filled with sandy silt
- Trench T4: - clayey silt
- very wet
- gravel at foundation level
- not vent pipe found

Soil Gas Extraction Wells

- Unit 71: Well A - gravel (10 cm)
- dry sandy soil
Well B - gravel (10 cm)
- wet silty soil, some clay
- Unit 72: Well A - gravel (20 cm)
- wet silty soil
- Unit 73: Well A - gravel (10 cm)
- wet sandy silt
- Unit 74: Well A - gravel (10 cm)
- damp sandy silt

APPENDIX A-14

CONNECTIVITY, PERMEABILITY AND INFLUENCE TESTS

Connectivity Testing

April 6

<u>Fan Location</u>	<u>Approximate Flow Rate (L/s)</u>	<u>Inlet Pipe</u>	<u>Approximate Flow Rate (L/s)</u>
V49F	36	V46F	<10
		V52F	0
V52R	30	V49R	0
		V52F	0
V49R	38	V47R	20
		V44R	0
		V46F	0
		V52R	0
V44R	27	V44F	0
		V47R	0
V44F	54	V46F	15
		V49F	<10
V71F	27	V71R	0

Conclusions:

1. V71R, V71F, V52F, V52R, V44R all clogged.
2. Good connection between V44F, V46F, V49F, and between V46R, V49R.
3. Repair clogged vents.

April 10

<u>Fan Location</u>	<u>Approximate Flow Rate (L/s)</u>	<u>Inlet Pipe</u>	<u>Approximate Flow Rate (L/s)</u>
V46R	42	V44R	<10
		V52R	<10
V49F	42	V52F	<10

Conclusion:

1. Previous vents which were clogged are now operable.

Permeability Testing

April 9

<u>Fan Location</u>	<u>Approximate Flow Rate (L/s)</u>	<u>Inlet Pipe</u>	<u>Pressure (Pa)</u>
V49F	37	V46F	-32.3
		V44F	-19.9
	34	V46F	-31.1
		V44F	-19.9
	24	V46F	-23.6
		V44F	-13.7
	10	V46F	-20.7
		V44F	-12.4
V46F	36	V44F	>-62.2 (off scale)
		V49F	-52.3
		V52F	-18.7
	34	V44F	>-62.2 (off scale)
		V49F	-42.3
		V52F	-13.9
	24	V44F	>-62.2 (off scale)
		V49F	-36.1
		V52F	-12.9
	10	V44F	-52.2
		V49F	-24.9
		V52F	-10.0
V46R	24	V52R	>-62.2 (off scale)
		V52R	>-62.2 (off scale)
	19	V52R	>-62.2 (off scale)
		V52R	>-62.2 (off scale)
	10	V52R	>-62.2 (off scale)
		V52R	>-62.2 (off scale)
10	V49R	>-62.2 (off scale)	
	V44R	>-62.2 (off scale)	

April 24

<u>Fan Location</u>	<u>Approximate Flow Rate (L/s)</u>	<u>Inlet Pipe</u>	<u>Pressure (Pa)</u>
V46R	10	V44R	-119.4
		V49R	-117.0
		V52R	-114.5
	24	V44R	-214.0
		V49R	-204.0
		V52R	-204.0

April 24 (cont'd)

Fan Location	Approximate Flow Rate (L/s)	Inlet Pipe	Pressure (Pa)
	27	V44R	-236.4
		V49R	-228.9
		V52R	-228.9
V49F	27	V52F	-34.8
		V46F	-17.7
		V44F	-11.9
	34	V52F	-52.8
		V46F	-26.6
		V44F	-18.7
	38	V52F	-62.2
		V46F	-29.9
		V44F	-19.9
V46F	10	V44F	-44.0
		V49F	-18.7
		V52F	-6.2
	24	V44F	-64.7
		V49F	-30.4
		V52F	-10.0
	30	V44F	-84.6
		V49F	-38.6
		V52F	-12.9
	34	V44F	-104.5
		V49F	-48.5
		V52F	-14.1

Influence Tests

1. Effect of Block A pumping system on soil probe M70R.

May 24

<u>Time</u>	<u>Pressure at M70R (Pa)</u>	<u>CH₄ Concentration (ppm)</u>
09:30	stop fan	
09:35	-11.2	-
09:55	-7.5	-
10:15	-3.7	-
10:25	-3.0	64% GAS
10:25	start fan	
10:34	-14.9	51% GAS
10:40	-17.4	42% GAS
10:45	-23.6	40% GAS

2. Effect of one vapour extraction well on the adjacent unit.

<u>Unit #</u>	<u>Monitor</u>	<u>Pressure-Damper in Off/On Position</u>		<u>Comments</u>
72	well	-89.6	-149.3	unit 73 well is off
	A	-21.2	-32.2	
	B	-17.9	-26.1	
72	well	-89.6		unit 73 well is on
	A	-21.4		
	B	-18.7		
72	well	-89.6		unit 71 well is on
	A	-21.4		
	B	-18.7		

Conclusion:

The slab probes are not significantly affected by wells in other units

Unit #	Monitor	Pressure-Damper in Off/On Position		Comments
73	well	-74.7	-124.42	unit 72 is off
	A	-47.3	-69.7	unit 74 is on
	B	-31.1	-46.5	
73	well	-64.7	-114.5	unit 74 is on
	A	-44.8	-67.2	unit 72 is on
	B	-32.3	-46.0	
73	well	-79.6	-144.0	unit 74 is off
	A	-51.0	-79.6	unit 72 is on
	B	-35.0	-53.5	

Conclusion: Unit 73 has good depressurization potential

Unit #	Monitor	Pressure-Damper in Off/On Position		Comments
74	well	-32.3	-69.7	unit 73 is on
	A	-7.5	-10.0	
	B	-3.7	-5.5	
74	well	-32.3	-79.6	unit 73 is off
	A	-6.2	-6.2	
	B	-3.5	-5.0	

Appendix A-15
SUB-SLAB PERMEABILITY TESTING

A figure-of-merit for sub-slab permeability can be derived from vacuum cleaner tests by measuring the pressure at two or more holes at known distances from the suction hole (one hole close to the exhaust point, the other further away). If the sub-slab material is homogeneous, then we can assume:

$$P_{\text{far}} / P_{\text{near}} = (D_{\text{near}} / D_{\text{far}})^{1/R}$$

The better the communication, the higher the value of "R", and that is our figure-of-merit.

The following table is from the Kitchener project tests, and shows the range of "R" of several housing units.

<u>House#</u>	<u>Distance (m)</u>		<u>Pressure (Pa)</u>		<u>R</u>
	<u>Near</u>	<u>Far</u>	<u>Near</u>	<u>Far</u>	
48	0.66	4.30	75	38	2.70
48	0.66	3.95	75	43	3.55
48	0.66	3.00	75	50	3.73
49	0.86	4.36	75	50	4.00
49	0.86	4.20	75	50	3.91
49	0.86	4.60	75	43	2.95
49	0.86	3.90	73	48	3.58
49	0.86	3.05	75	55	4.08
52	0.56	5.20	200	150	7.75
71	0.7	5.30	165	65	2.17
71	0.7	5.20	165	70	2.34
71	0.7	3.10	165	65	1.60
71	0.7	3.15	165	90	2.48
71	0.7	3.20	165	80	2.10
71	0.7	3.30	165	100	3.10
72	0.58	5.00	35	18	3.11
73	0.78	4.80	165	115	5.03
74	0.59	4.60	35	18	2.96
74	0.6	3.40	25	15	3.40

APPENDIX B

SUPPLEMENTARY DOCUMENTATION

APPENDIX B-1

SUMMARY OF POWER OUTAGES AT

400-440 STRASBURG ROAD

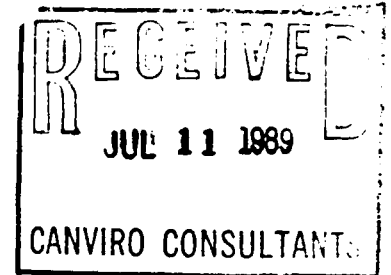


KITCHENER-WILMOT HYDRO

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KITCHENER ONTARIO
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July 6, 1989
File No. 8220-75-1

Canviro Consultants
180 King St. S.
Suite 600
Waterloo, Ontario
N2J 1P8



Attention: Mr. Martin Adomait
Subject: Power Outages to Townhouses at
400 - 440 Strasburg Rd. near Ottawa St. S.

Dear Mr. Adomait:

In response to your inquiry of July 4, 1989, we have searched our records back to Jan 1, 1987 and have the following information to report.

<u>Year</u>	<u># Outages</u>	<u>Causes</u>
1987	10 Outages 5 momentary <1 min. 1 - 5 minutes 1 - 19 minutes 1 - 21 minutes 1 - 60 minutes 1 - 74 minutes	6 storm related 2 planned 2 other
1988	7 Outages 4 momentary <1 min. 1 - 6 minutes 1 - 28 minutes 1 - 84 minutes	4 storm related 3 other
1989 (till end of June)	2 Outages 1 momentary <1 min. 1 - 31 minutes	2 other

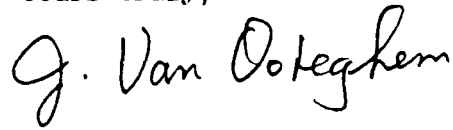
TOTAL = 19 Outages

July 6, 1989

Our experience indicates that this is an exceptionally high number of outages for one location. It is expected that the long term average would be significantly less than that of the last 2 1/2 years.

I trust this is the information you are after. Please let me know if you have any questions about the information presented.

Yours truly,

A handwritten signature in cursive script that reads "J. Van Ooteghem".

Jerry Van Ooteghem
Assistant Operations Manager

JVO:cg