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North Anna COL Project
Hydraulic Conductivity (K) Calculation Worksheet
MACTEC Job Number: 6468-06-1472

Well: OW-949
Test Date: 11/14/2006
Test Type: Recovery (slug out)
Test Name: OW-949-out2

Conducted by: Grimes & Charles-Smith
Entered/date: [illegible] 12/12/06
Checked/date: SCP 12/12/06 by [illegible] with permission

WELL DATA

SWL =	23.41	(ft BTOC)
WD =	106.50	(ft BTOC)
WD =	104.50	(ft BGS)
DTSP =	87.00	(ft BGS)
rc =	0.08	(ft)
n =	0.30	
rw =	0.25	(ft)
rc (adjusted) =	0.08	(ft)
Le =	10	(ft)
Lw =	81.12	(ft)
Le/rw =	40.00	
H =	81.12	(ft)

Because well is completed in bedrock, H is depth from SWL to bottom of screened interval of well

CALCULATION OF K

K = [(rc^2 ln(Re/rw))/2Le]*(1/t)ln(yo/yt)

yo =	3.32	(ft) from plot
yt =	0.50	(ft) from plot
t =	1.48	(minutes) from plot
ln(Re/rw) =	4.00	
K =	2.4E+00	(ft/day)
K =	8.4E-04	(cm/sec)

Calculation of ln(Re/rw)

Where: Lw < H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{A+Bln((H-Lw)/rw)}/(Le/rw)]^-1= #NUM!

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 4.00

Calculation of Coefficients

Value range for Le/rw from Table of Coefficients

Le/rw	A	B	C
40	2.75	0.45	2.45
50	3	0.5	2.7

Interpolated values of A, B and C for Le/rw

40.00	2.75	0.45	2.45

Coefficients Table

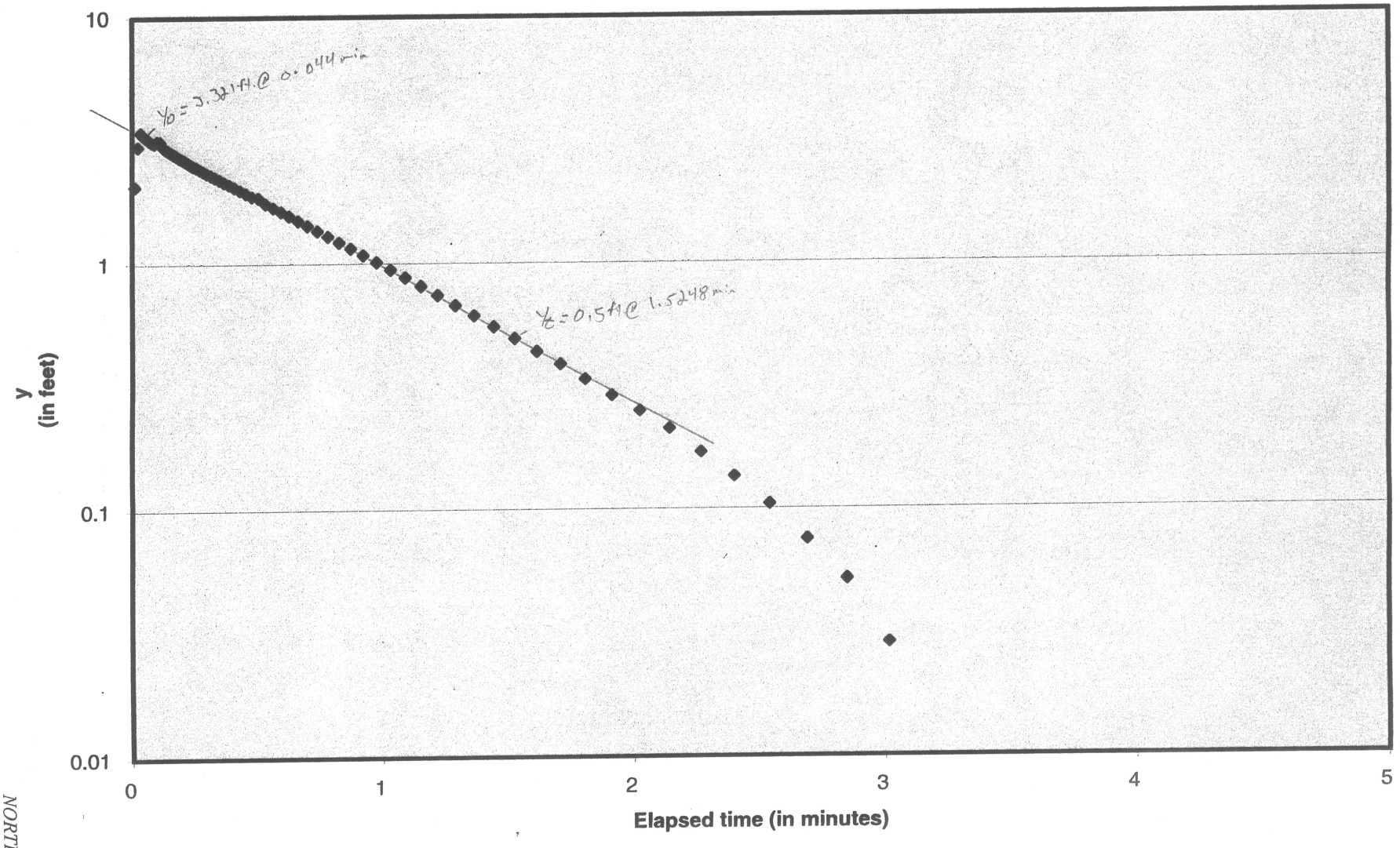
Le/rw	A	Le/rw	B	Le/rw	C
4	1.75	4	0.25	4	0.75
5	1.76	5	0.25	5	0.85
6	1.77	6	0.25	6	0.90
7	1.80	7	0.25	7	1.00
8	1.83	8	0.25	8	1.10
9	1.90	9	0.25	9	1.20
10	1.95	10	0.25	10	1.30
15	2.10	15	0.27	15	1.50
20	2.23	20	0.29	20	1.75
25	2.40	25	0.31	25	1.90
30	2.50	30	0.35	30	2.10
40	2.75	40	0.45	40	2.45
50	3.00	50	0.50	50	2.70
60	3.45	60	0.52	60	3.00
70	3.70	70	0.60	70	3.40
80	3.90	80	0.65	80	3.60
90	4.20	90	0.70	90	3.85
100	4.50	100	0.75	100	4.20
150	5.45	150	0.98	150	5.70
200	6.10	200	1.20	200	7.00
250	6.70	250	1.30	250	8.00
300	7.10	300	1.50	300	8.80
400	7.75	400	1.90	400	9.90
500	8.20	500	2.20	500	10.60
600	8.50	600	2.33	600	11.10
700	8.70	700	2.50	700	11.50
800	8.90	800	2.70	800	11.80
900	9.00	900	2.75	900	12.00
1000	9.20	1000	2.83	1000	12.40
1500	9.50	1500	3.18	1500	12.90

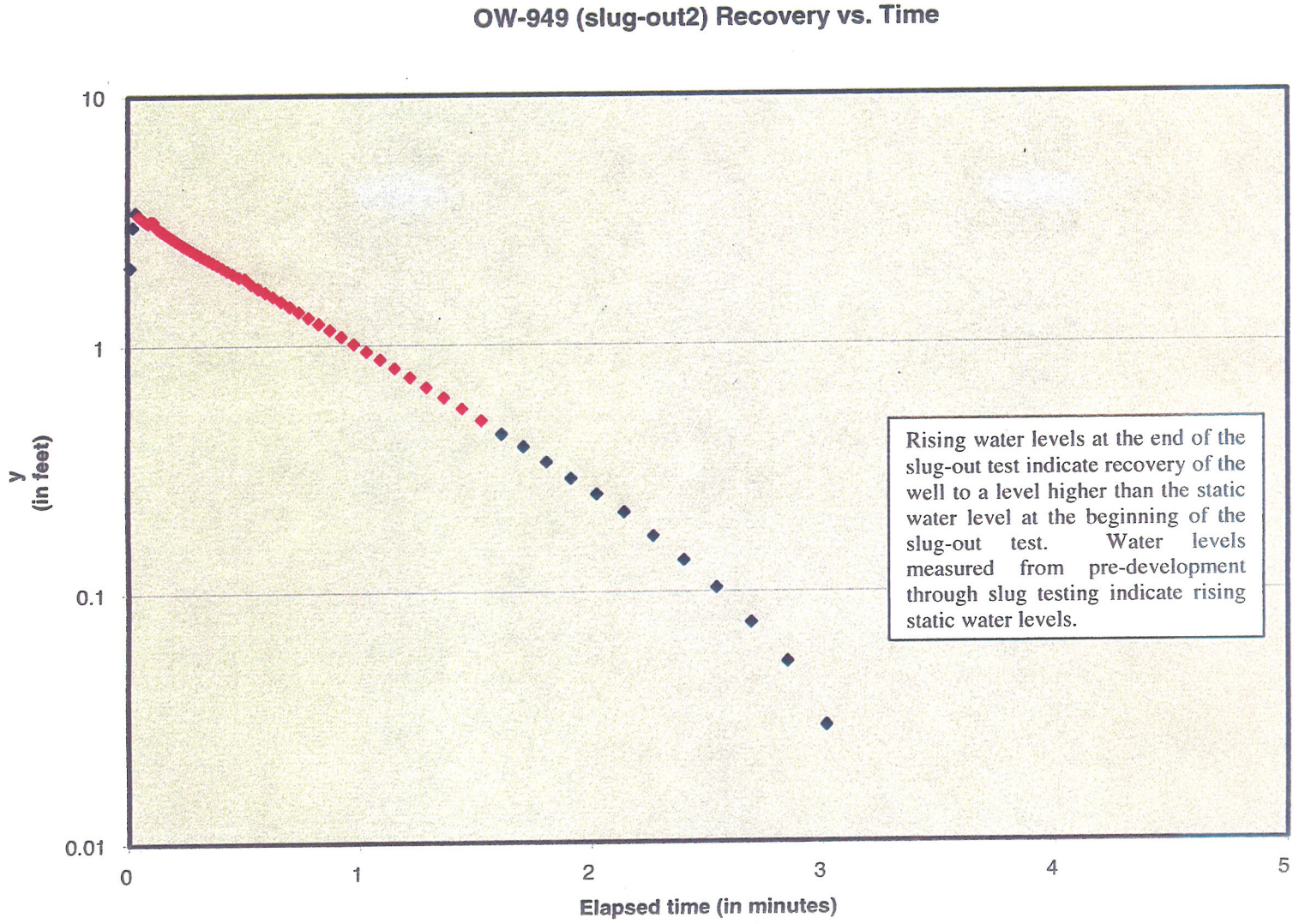
Reference: Bouwer(1989), Bouwer and Rice(1976)

TEST DATA

Elapsed time (min)	Log y	y (ft)	WL (ft BTOC)	
0	#NUM!	0	23.41	
0.011	0.31	2.053	25.46	
0.022	0.48	2.991	26.40	
0.033	0.53	3.41	26.82	
0.044	0.52	3.321	26.73	Test initializatio
0.055	0.51	3.252	26.66	
0.066	0.50	3.186	26.60	
0.077	0.49	3.126	26.54	
0.088	0.49	3.088	26.50	
0.099	0.50	3.149	26.56	
0.11	0.50	3.137	26.55	
0.121	0.48	2.996	26.41	
0.132	0.47	2.93	26.34	
0.143	0.46	2.881	26.29	
0.154	0.45	2.832	26.24	
0.165	0.45	2.789	26.20	
0.176	0.44	2.743	26.15	
0.187	0.43	2.7	26.11	
0.198	0.42	2.66	26.07	
0.209	0.42	2.617	26.03	
0.22	0.41	2.576	25.99	
0.231	0.40	2.536	25.95	
0.2427	0.40	2.493	25.90	
0.2552	0.39	2.459	25.87	
0.2683	0.38	2.413	25.82	
0.2823	0.38	2.372	25.78	
0.2972	0.37	2.326	25.74	
0.3128	0.36	2.28	25.69	
0.3295	0.35	2.234	25.64	
0.3472	0.34	2.185	25.60	
0.3658	0.33	2.137	25.55	
0.3857	0.32	2.085	25.50	
0.4067	0.31	2.033	25.44	
0.4288	0.30	1.978	25.39	
0.4523	0.28	1.924	25.33	
0.4772	0.27	1.866	25.28	
0.5035	0.26	1.84	25.25	
0.5315	0.24	1.743	25.15	
0.5612	0.23	1.679	25.09	
0.5925	0.21	1.619	25.03	
0.6257	0.19	1.556	24.97	
0.6608	0.17	1.49	24.90	
0.6982	0.15	1.421	24.83	
0.7377	0.13	1.354	24.76	
0.7795	0.11	1.285	24.70	
0.8238	0.08	1.216	24.63	
0.8708	0.06	1.15	24.56	
0.9207	0.03	1.078	24.49	
0.9733	0.01	1.012	24.42	
1.0292	-0.03	0.943	24.35	
1.0883	-0.06	0.877	24.29	
1.151	-0.09	0.811	24.22	
1.2173	-0.13	0.745	24.16	
1.2877	-0.17	0.679	24.09	
1.3622	-0.21	0.618	24.03	
1.4412	-0.25	0.558	23.97	
1.5248	-0.30	0.5	23.91	Test completion
1.6133	-0.35	0.443	23.85	
1.7072	-0.40	0.394	23.80	
1.8065	-0.47	0.342	23.75	
1.9118	-0.53	0.293	23.70	90% recovery
2.0233	-0.60	0.253	23.66	
2.1415	-0.67	0.213	23.62	
2.2667	-0.77	0.17	23.58	
2.3992	-0.87	0.135	23.55	
2.5397	-0.98	0.104	23.51	
2.6885	-1.12	0.075	23.49	
2.846	-1.28	0.052	23.46	
3.0127	-1.54	0.029	23.44	
3.1793	-2.05	0.009	23.42	

OW-949 (slug-out2) Recovery vs. Time




OW-949 (slug-out2) Recovery vs. Time
10
1
0.1
0.01
y
(in feet)
0
1
2
3
4
5
Elapsed time (in minutes)
Rising water levels at the end of the slug-out test indicate recovery of the well to a level higher than the static water level at the beginning of the slug-out test. Water levels measured from pre-development through slug testing indicate rising static water levels.

MACTEC

MACTEC Engineering and Consulting
3301 Atlantic Avenue
Raleigh, North Carolina

Slug Test Data Sheet

MACTEC Job Name:	North Anna COL	**MACTEC Job Number:**	6468-06-1472
Date:	11-14-06	**Time:**	1035
Observation Well No.:	OW949IUT2		
Weather Conditions:	Sunny, Approx 60°F		
Method of Slug Withdrawl (circle one):	water, (mechanical) or pressure	**Test Method:**	(Rising Head) or Falling Head (circle)
Diameter of Screen:	2 in.	**Diameter of Casing:**	2 in.
Total Well Depth:	104.5 ft below reference point	**Reference Point:**	Permanent mark on top of casing
Length of Screened Section:	10 ft	**Depth interval of screened portion:**	92.5 - 102.5 ft
Depth to Groundwater:	23.41 ft below reference point		

Groundwater Measurements Collected Prior to Slug Test

Depth to Groundwater	Date
23.80 (pre Development)	11-2-06
23.54 (post Development)	11-7-06
23.50 (OW949IN)	11-14-06
23.40 (OW949IUT)	11-14-06
23.38 (OW949IM2)	11-14-06
23.41 (OW949IUT2)	11-14-06

Comments/Remarks

USED Transducer SN 100513
Hermit 3000
Set Transducer 35' below TOC
Transducer 23.40 vs. = 23.41 STATIC.
Find Hermit reading = .023
OFFSET = 3.410
* 101% Recovery ?

In-Situ Inc. Hermit 3000

Report generated: 12/11/06 17:40:36
Report from file: P:\6468\2006 Projects\1472 North Anna COL\Slug Test Data\Raw data logger fil
DataMgr Version 3.71

al number: 00045369
mware Version 7.08
Unit name: HERMIT 3000

Test name: OW949out2 PAGE 1 OF 2

Test defined on: 11/14/06 10:44:19
Test started on: 11/14/06 11:34:31
Test stopped on: 11/14/06 11:39:12
Test extracted on: 11/14/06 12:08:01

Data gathered using Logarithmic testing
Maximum time between data points: 0.1667 Minutes.
Number of data samples: 78

TOTAL DATA SAMPLES 78

Channel number [1]
Measurement type: Pressure
Channel name: D00513
Linearity: 0.0212000
Scale: 19.9368000
Offset: 0.1304000
Warmup: 50
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Feet H2O
eferenced on: test start
ressure head at reference: 11.335 Feet H2O

Channel number [0]
Measurement type: Barometric Pressure
Channel name: Barometric
Linearity: 0.0000000
Scale: 0.0000000
Offset: 0.0000000
Warmup: 50

Date	Time	ET (min)	Chan[1] Feet H2O	Chan[0] Inches Hg
11/14/06	11:34:31	0.0000	0.000	29.599
11/14/06	11:34:31	0.0110	2.053	29.599
11/14/06	11:34:32	0.0220	2.991	29.597
11/14/06	11:34:32	0.0330	3.410	29.599
11/14/06	11:34:33	0.0440	3.321	29.597
11/14/06	11:34:34	0.0550	3.252	29.599
11/14/06	11:34:34	0.0660	3.186	29.597
11/14/06	11:34:35	0.0770	3.126	29.599
11/14/06	11:34:36	0.0880	3.088	29.599
11/14/06	11:34:36	0.0990	3.149	29.599
11/14/06	11:34:37	0.1100	3.137	29.597
11/14/06	11:34:38	0.1210	2.996	29.601
11/14/06	11:34:38	0.1320	2.930	29.595
11/14/06	11:34:39	0.1430	2.881	29.597
11/14/06	11:34:40	0.1540	2.832	29.601
11/14/06	11:34:40	0.1650	2.789	29.601
11/14/06	11:34:41	0.1760	2.743	29.603
11/14/06	11:34:42	0.1870	2.700	29.601
11/14/06	11:34:42	0.1980	2.660	29.597
11/14/06	11:34:43	0.2090	2.617	29.601
11/14/06	11:34:44	0.2200	2.576	29.599

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11/14/06	11:34:44	0.2310	2.536	29.601
11/14/06	11:34:45	0.2427	2.493	29.599
11/14/06	11:34:46	0.2552	2.459	29.601
11/14/06	11:34:47	0.2683	2.413	29.601
11/14/06	11:34:47	0.2823	2.372	29.597
11/14/06	11:34:48	0.2972	2.326	29.599
14/06	11:34:49	0.3128	2.280	29.597
,14/06	11:34:50	0.3295	2.234	29.601
11/14/06	11:34:51	0.3472	2.185	29.599
11/14/06	11:34:52	0.3658	2.137	29.595
11/14/06	11:34:54	0.3857	2.085	29.599
11/14/06	11:34:55	0.4067	2.033	29.601
11/14/06	11:34:56	0.4288	1.978	29.601
11/14/06	11:34:58	0.4523	1.924	29.601
11/14/06	11:34:59	0.4772	1.866	29.597
11/14/06	11:35:01	0.5035	1.840	29.599
11/14/06	11:35:02	0.5315	1.743	29.599
11/14/06	11:35:04	0.5612	1.679	29.597
11/14/06	11:35:06	0.5925	1.619	29.599
11/14/06	11:35:08	0.6257	1.556	29.599
11/14/06	11:35:10	0.6608	1.490	29.597
11/14/06	11:35:12	0.6982	1.421	29.601
11/14/06	11:35:15	0.7377	1.354	29.599
11/14/06	11:35:17	0.7795	1.285	29.597
11/14/06	11:35:20	0.8238	1.216	29.599
11/14/06	11:35:23	0.8708	1.150	29.599
11/14/06	11:35:26	0.9207	1.078	29.599
11/14/06	11:35:29	0.9733	1.012	29.595
11/14/06	11:35:32	1.0292	0.943	29.599
11/14/06	11:35:36	1.0883	0.877	29.597
11/14/06	11:35:40	1.1510	0.811	29.595
11/14/06	11:35:44	1.2173	0.745	29.595
11/14/06	11:35:48	1.2877	0.679	29.597
11/14/06	11:35:52	1.3622	0.618	29.597
'14/06	11:35:57	1.4412	0.558	29.597
14/06	11:36:02	1.5248	0.500	29.597
11/14/06	11:36:07	1.6133	0.443	29.599
11/14/06	11:36:13	1.7072	0.394	29.599
11/14/06	11:36:19	1.8065	0.342	29.597
11/14/06	11:36:25	1.9118	0.293	29.597
11/14/06	11:36:32	2.0233	0.253	29.597
11/14/06	11:36:39	2.1415	0.213	29.599
11/14/06	11:36:47	2.2667	0.170	29.599
11/14/06	11:36:54	2.3992	0.135	29.597
11/14/06	11:37:03	2.5397	0.104	29.597
11/14/06	11:37:12	2.6885	0.075	29.599
11/14/06	11:37:21	2.8460	0.052	29.595
11/14/06	11:37:31	3.0127	0.029	29.597
11/14/06	11:37:41	3.1793	0.009	29.601
11/14/06	11:37:51	3.3460	-0.006	29.603
11/14/06	11:38:01	3.5127	-0.023	29.597
11/14/06	11:38:11	3.6793	-0.035	29.601
11/14/06	11:38:21	3.8460	-0.043	29.601
11/14/06	11:38:31	4.0127	-0.052	29.601
11/14/06	11:38:41	4.1793	-0.058	29.601
11/14/06	11:38:51	4.3460	-0.066	29.601
11/14/06	11:39:01	4.5127	-0.075	29.601