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

Well: OW-946
Test Date: 11/14/2006
Test Type: Recovery (slug in)
Test Name: OW-946-in2

Conducted by: Charles-Smith
Entered/date: CWSB / 12-4-06
Checked/date: JCP by ATM with permission 12/12/06

TEST DATA

WELL DATA

SWL =	26.44	(ft BTOC)
WD =	45.90	(ft BTOC)
WD =	43.40	(ft BGS)
DTSP =	25.20	(ft BGS)
rc =	0.08	(ft)
n =	0.30	
rw =	0.35	(ft)
rc (adjusted) =	0.20	(ft)
Le =	10	(ft)
Lw =	16.46	(ft)
Le/rw =	28.57	
H =	17.86	(ft)

H is depth from SWL to top of bedrock as listed on boring logs

CALCULATION OF K

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

yo =	2.18	(ft) from plot
yt =	0.86	(ft) from plot
t =	0.96	(minutes) from plot
ln(Re/rw) =	2.56	
K =	7.4E+00	(ft/day)
K =	2.6E-03	(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= 2.56

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 2.78

Calculation of Coefficients

Value range for Le/rw from Table of Coefficients

Le/rw	A	B	C
25	2.4	0.31	1.9
30	2.5	0.35	2.1

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

28.57	2.47	0.34	2.04

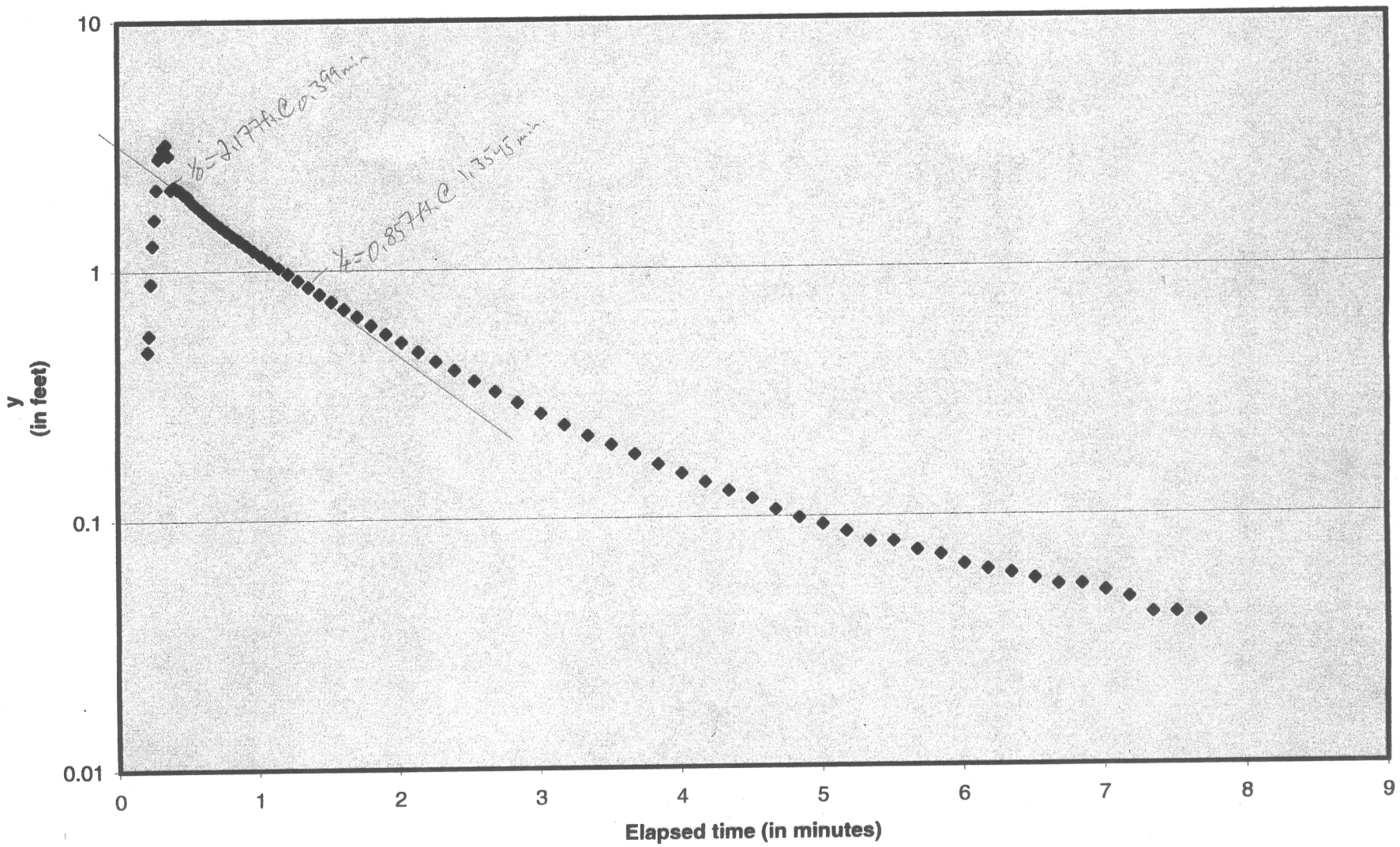
Coefficients Table

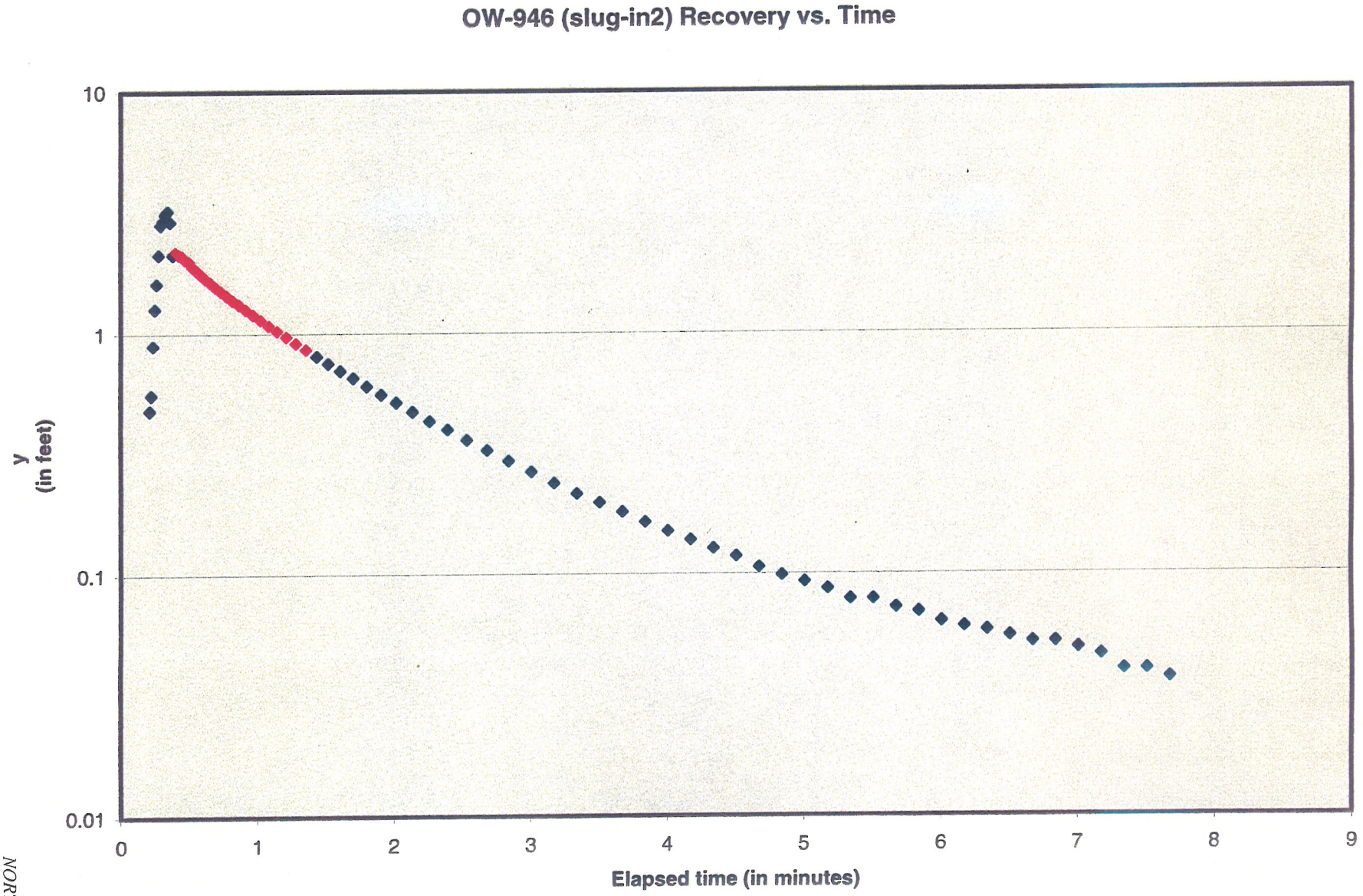
Le/rw	A	Le/rw	B	Le/rw	C
4	1.75	4	0.25	4	0.75
5	1.76	5	0.25	5	0.85
6	1.77	6	0.25	6	0.90
7	1.80	7	0.25	7	1.00
8	1.83	8	0.25	8	1.10
9	1.90	9	0.25	9	1.20
10	1.95	10	0.25	10	1.30
15	2.10	15	0.27	15	1.50
20	2.23	20	0.29	20	1.75
25	2.40	25	0.31	25	1.90
30	2.50	30	0.35	30	2.10
40	2.75	40	0.45	40	2.45
50	3.00	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)

Elapsed time (min)	Log y	y (ft)	WL (ft BTOC)	
0	#NUM!	0	26.44	
0.0112	#NUM!	0	26.44	
0.0223	-2.52	0.003	26.44	
0.0335	#NUM!	0	26.44	
0.0447	-2.22	0.006	26.43	
0.0558	-2.52	0.003	26.44	
0.067	#NUM!	0	26.44	
0.0782	-2.52	0.003	26.44	
0.0893	#NUM!	0	26.44	
0.1005	-2.52	0.003	26.44	
0.1117	-2.52	0.003	26.44	
0.1228	#NUM!	0	26.44	
0.134	-2.52	0.003	26.44	
0.1452	-2.22	0.006	26.43	
0.1563	-2.52	0.003	26.44	
0.1675	-2.52	0.003	26.44	
0.1787	-2.22	0.006	26.43	
0.1898	-2.22	0.006	26.43	
0.201	-2.05	0.009	26.43	
0.2122	-0.32	0.483	25.96	
0.2233	-0.25	0.558	25.88	
0.235	-0.05	0.891	25.55	
0.2475	0.10	1.268	25.17	
0.2607	0.21	1.613	24.83	
0.2747	0.33	2.128	24.31	
0.2895	0.45	2.83	23.61	
0.3052	0.47	2.939	23.50	
0.3218	0.50	3.134	23.31	
0.3395	0.51	3.226	23.21	
0.3582	0.46	2.91	23.53	
0.378	0.33	2.125	24.32	
0.399	0.34	2.177	24.26	Test initialization
0.4212	0.33	2.131	24.31	
0.4447	0.32	2.105	24.34	
0.4695	0.31	2.036	24.40	
0.4958	0.30	1.998	24.44	
0.5238	0.28	1.898	24.54	
0.5535	0.26	1.829	24.61	
0.5848	0.25	1.766	24.67	
0.618	0.23	1.699	24.74	
0.6532	0.21	1.636	24.80	
0.6905	0.20	1.57	24.87	
0.73	0.18	1.507	24.93	
0.7718	0.16	1.446	24.99	
0.8162	0.14	1.38	25.06	
0.8632	0.12	1.323	25.12	
0.913	0.10	1.262	25.18	
0.9657	0.08	1.202	25.24	
1.0215	0.06	1.142	25.30	
1.0807	0.03	1.081	25.36	
1.1433	0.01	1.024	25.42	
1.2097	-0.01	0.969	25.47	
1.28	-0.04	0.909	25.53	
1.3545	-0.07	0.857	25.58	Test completion
1.4335	-0.10	0.802	25.64	
1.5172	-0.12	0.75	25.69	
1.6057	-0.16	0.699	25.74	
1.6995	-0.19	0.653	25.79	
1.7988	-0.22	0.604	25.84	
1.9042	-0.25	0.558	25.88	
2.0157	-0.29	0.518	25.92	
2.1338	-0.32	0.474	25.97	
2.259	-0.36	0.434	26.01	
2.3915	-0.40	0.4	26.04	
2.532	-0.44	0.362	26.08	
2.6808	-0.48	0.328	26.11	
2.8383	-0.53	0.296	26.14	90% recovery
3.005	-0.57	0.267	26.17	
3.1717	-0.62	0.239	26.20	
3.3383	-0.67	0.216	26.22	
3.505	-0.70	0.198	26.24	
3.6717	-0.74	0.181	26.26	
3.8383	-0.79	0.164	26.28	
4.005	-0.82	0.15	26.29	
4.1717	-0.86	0.138	26.30	
4.3383	-0.90	0.127	26.31	
4.505	-0.93	0.118	26.32	
4.6717	-0.97	0.106	26.33	
4.8383	-1.01	0.098	26.34	
5.005	-1.04	0.092	26.35	

OW-946 (slug-in2) Recovery vs. Time




OW-946 (slug-in2) Recovery vs. Time
10
1
0.1
0.01
y
(in feet)
0
1
2
3
4
5
6
7
8
9
Elapsed time (in minutes)

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Raleigh, North Carolina

Slug Test Data Sheet

MACTEC Job Name:	North Anna COL	**MACTEC Job Number:**	6468-06-1472
Date:	11-14-06 **Time:** 1606	**Observation Well No.:**	OW96IN2
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:	43.4 ft below reference point	**Reference Point:**	Permanent mark on top of casing
Length of Screened Section:	10 ft	**Depth interval of screened portion:**	30.4-40.4 ft
Depth to Groundwater:	26.44 ft below reference point		

Groundwater Measurements Collected Prior to Slug Test

Depth to Groundwater	Date
26.39 (pre-Deployment)	11-14-06
26.53 (post-Deployment)	11-14-06
26.43 (OW96IN2T)	11-14-06

Comments/Remarks

Used Transducer SN10513
Hermit 3000
Set Transducer 35' below TOC
Transducer = 26.43' vs. 26.44' static
OFFSet = 3.226
Final Hermit = -.037

In-Situ Inc. Hermit 3000

Report generated: 12/11/06 17:41:03
Report from file: P:\6468\2006 Projects\1472 North Anna COL\Slug Test Data\Raw data logger fil
DataMgr Version 3.71

ial number: 00045369
Firmware Version 7.08
Unit name: HERMIT 3000

Test name: OW946IN2 PAGE 1 OF 3

Test defined on: 11/14/06 17:08:47
Test started on: 11/14/06 17:11:31
Test stopped on: 11/14/06 17:19:13
Test extracted on: 11/14/06 18:02:13

Data gathered using Logarithmic testing
Maximum time between data points: 0.1667 Minutes.
Number of data samples: 96

TOTAL DATA SAMPLES 96

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
Referenced on: test start
Pressure head at reference: 8.557 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	17:11:31	0.0000	0.000	29.567
11/14/06	17:11:31	0.0112	0.000	29.567
11/14/06	17:11:32	0.0223	-0.003	29.567
11/14/06	17:11:33	0.0335	0.000	29.567
11/14/06	17:11:33	0.0447	-0.006	29.571
11/14/06	17:11:34	0.0558	-0.003	29.573
11/14/06	17:11:35	0.0670	0.000	29.567
11/14/06	17:11:35	0.0782	-0.003	29.567
11/14/06	17:11:36	0.0893	0.000	29.569
11/14/06	17:11:37	0.1005	-0.003	29.571
11/14/06	17:11:37	0.1117	-0.003	29.567
11/14/06	17:11:38	0.1228	0.000	29.569
11/14/06	17:11:39	0.1340	-0.003	29.571
11/14/06	17:11:39	0.1452	-0.006	29.571
11/14/06	17:11:40	0.1563	-0.003	29.567
11/14/06	17:11:41	0.1675	-0.003	29.569
11/14/06	17:11:41	0.1787	-0.006	29.569
11/14/06	17:11:42	0.1898	-0.006	29.571
11/14/06	17:11:43	0.2010	-0.009	29.569
11/14/06	17:11:43	0.2122	-0.483	29.571
11/14/06	17:11:44	0.2233	-0.558	29.567

11/14/06	17:11:45	0.2350	-0.891	29.567
11/14/06	17:11:45	0.2475	-1.268	29.567
11/14/06	17:11:46	0.2607	-1.613	29.569
11/14/06	17:11:47	0.2747	-2.128	29.571
11/14/06	17:11:48	0.2895	-2.830	29.567
11/14/06	17:11:49	0.3052	-2.939	29.569
'14/06	17:11:50	0.3218	-3.134	29.563
14/06	17:11:51	0.3395	-3.226	29.569
11/14/06	17:11:52	0.3582	-2.910	29.565
11/14/06	17:11:53	0.3780	-2.125	29.571
11/14/06	17:11:54	0.3990	-2.177	29.571
11/14/06	17:11:56	0.4212	-2.131	29.569
11/14/06	17:11:57	0.4447	-2.105	29.569
11/14/06	17:11:59	0.4695	-2.036	29.569
11/14/06	17:12:00	0.4958	-1.998	29.567
11/14/06	17:12:02	0.5238	-1.898	29.569
11/14/06	17:12:04	0.5535	-1.829	29.569
11/14/06	17:12:06	0.5848	-1.766	29.569
11/14/06	17:12:08	0.6180	-1.699	29.571
11/14/06	17:12:10	0.6532	-1.636	29.571
11/14/06	17:12:12	0.6905	-1.570	29.571
11/14/06	17:12:14	0.7300	-1.507	29.569
11/14/06	17:12:17	0.7718	-1.446	29.571
11/14/06	17:12:19	0.8162	-1.380	29.569
11/14/06	17:12:22	0.8632	-1.323	29.571
11/14/06	17:12:25	0.9130	-1.262	29.571
11/14/06	17:12:28	0.9657	-1.202	29.573
11/14/06	17:12:32	1.0215	-1.142	29.569
11/14/06	17:12:35	1.0807	-1.081	29.571
11/14/06	17:12:39	1.1433	-1.024	29.571
11/14/06	17:12:43	1.2097	-0.969	29.569
11/14/06	17:12:47	1.2800	-0.909	29.567
11/14/06	17:12:52	1.3545	-0.857	29.573
11/14/06	17:12:57	1.4335	-0.802	29.571
11/14/06	17:13:02	1.5172	-0.750	29.569
'14/06	17:13:07	1.6057	-0.699	29.571
11/14/06	17:13:12	1.6995	-0.653	29.569
11/14/06	17:13:18	1.7988	-0.604	29.565
11/14/06	17:13:25	1.9042	-0.558	29.571
11/14/06	17:13:31	2.0157	-0.518	29.571
11/14/06	17:13:39	2.1338	-0.474	29.571
11/14/06	17:13:46	2.2590	-0.434	29.569
11/14/06	17:13:54	2.3915	-0.400	29.569
11/14/06	17:14:02	2.5320	-0.362	29.569
11/14/06	17:14:11	2.6808	-0.328	29.569
11/14/06	17:14:21	2.8383	-0.296	29.571
11/14/06	17:14:31	3.0050	-0.267	29.569
11/14/06	17:14:41	3.1717	-0.239	29.569
11/14/06	17:14:51	3.3383	-0.216	29.567
11/14/06	17:15:01	3.5050	-0.198	29.569
11/14/06	17:15:11	3.6717	-0.181	29.569
11/14/06	17:15:21	3.8383	-0.164	29.569
11/14/06	17:15:31	4.0050	-0.150	29.569
11/14/06	17:15:41	4.1717	-0.138	29.571
11/14/06	17:15:51	4.3383	-0.127	29.575
11/14/06	17:16:01	4.5050	-0.118	29.573
11/14/06	17:16:11	4.6717	-0.106	29.569
11/14/06	17:16:21	4.8383	-0.098	29.571
11/14/06	17:16:31	5.0050	-0.092	29.571
11/14/06	17:16:41	5.1717	-0.086	29.571
11/14/06	17:16:51	5.3383	-0.078	29.571
11/14/06	17:17:01	5.5050	-0.078	29.528
11/14/06	17:17:11	5.6717	-0.072	29.544
'14/06	17:17:21	5.8383	-0.069	29.551
/14/06	17:17:31	6.0050	-0.063	29.557
11/14/06	17:17:41	6.1717	-0.060	29.555
11/14/06	17:17:51	6.3383	-0.058	29.555
11/14/06	17:18:01	6.5050	-0.055	29.555
11/14/06	17:18:11	6.6717	-0.052	29.557
11/14/06	17:18:21	6.8383	-0.052	29.559

11/14/06	17:18:31	7.0050	-0.049	29.559
11/14/06	17:18:41	7.1717	-0.046	29.561
11/14/06	17:18:51	7.3383	-0.040	29.561
11/14/06	17:19:01	7.5050	-0.040	29.561
11/14/06	17:19:11	7.6717	-0.037	29.559

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

Well: OW-946
Test Date: 11/14/2006
Test Type: Recovery (slug out)
Test Name: OW-946-out

Conducted by: Charles Smith
Entered/date: WJB 12-4-06
Checked/date: JCP 12/12/06 by CAm with permission

WELL DATA

SWL =	26.43	(ft BTOC)
WD =	45.90	(ft BTOC)
WD =	43.40	(ft BGS)
DTSP =	25.20	(ft BGS)
rc =	0.08	(ft)
n =	0.30	
rw =	0.35	(ft)
rc (adjusted) =	0.20	(ft)
Le =	10	(ft)
Lw =	16.47	(ft)
Le/rw =	28.57	
H =	17.87	(ft)

H is depth from SWL to top of bedrock as listed on boring logs

CALCULATION OF K

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

yo =	2.57	(ft) from plot
yt =	0.19	(ft) from plot
t =	2.00	(minutes) from plot
ln(Re/rw) =	2.56	
K =	9.9E+00	(ft/day)
K =	3.5E-03	(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= 2.56

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 2.78

Calculation of Coefficients

Value range for Le/rw from Table of Coefficients

Le/rw	A	B	C
25	2.4	0.31	1.9
30	2.5	0.35	2.1

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

28.57	2.47	0.34	2.04

Coefficients Table

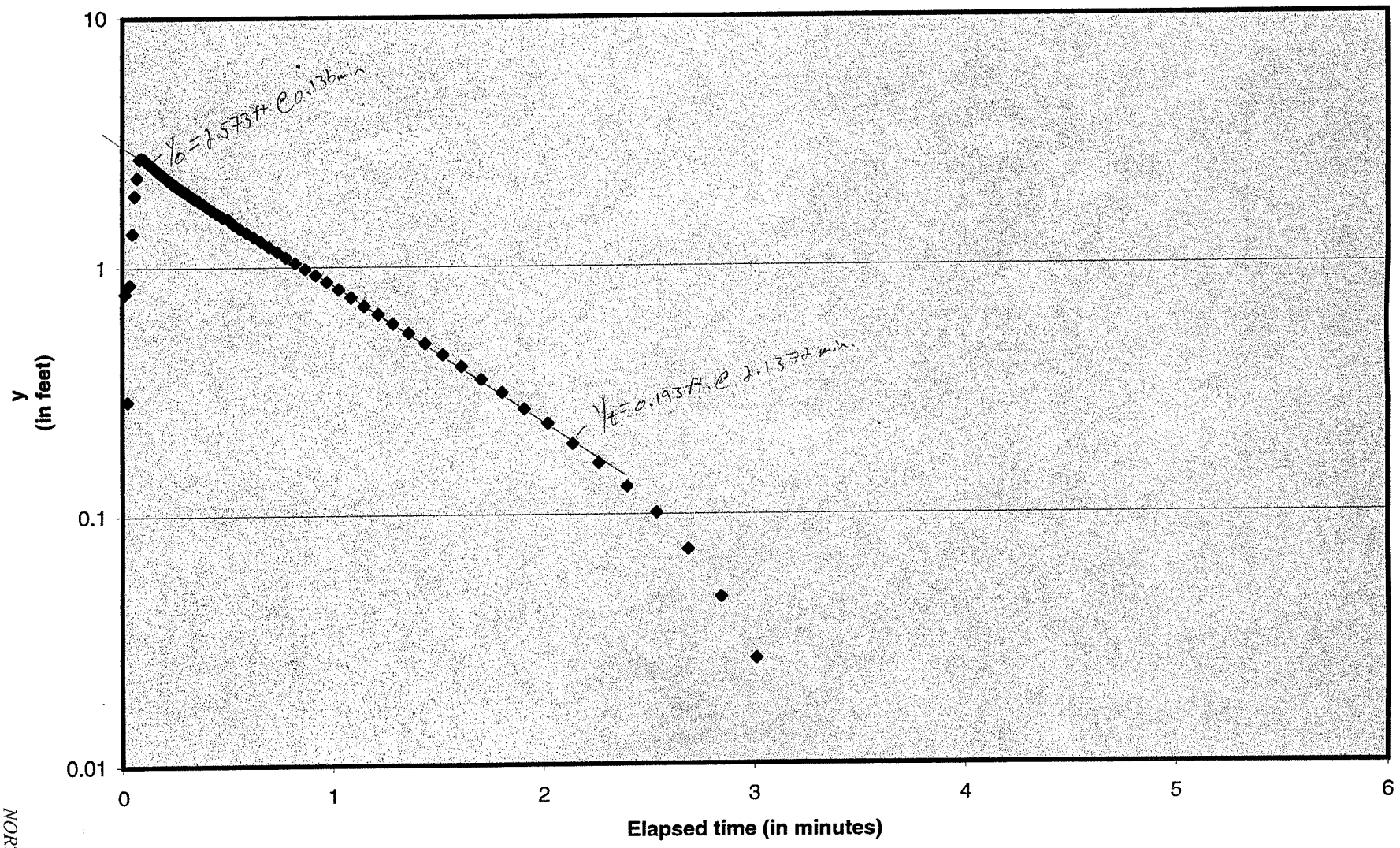
Le/rw	A	Le/rw	B	Le/rw	C
4	1.75	4	0.25	4	0.75
5	1.76	5	0.25	5	0.85
6	1.77	6	0.25	6	0.90
7	1.80	7	0.25	7	1.00
8	1.83	8	0.25	8	1.10
9	1.90	9	0.25	9	1.20
10	1.95	10	0.25	10	1.30
15	2.10	15	0.27	15	1.50
20	2.23	20	0.29	20	1.75
25	2.40	25	0.31	25	1.90
30	2.50	30	0.35	30	2.10
40	2.75	40	0.45	40	2.45
50	3.00	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)

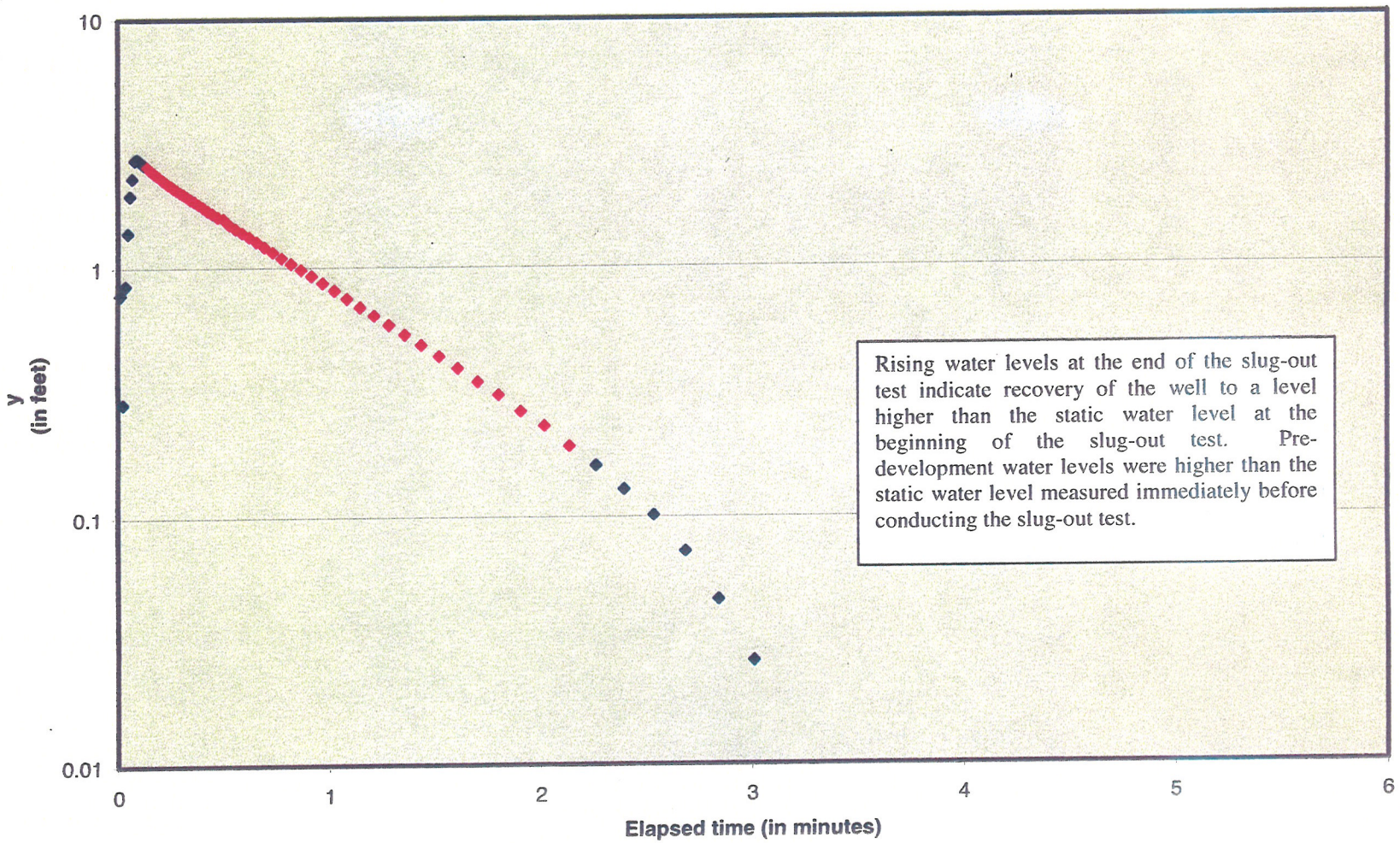
TEST DATA

Elapsed time (min)	Log y	y (ft)	WL (ft BTOC)	
0	#NUM!	0	26.43	
0.0113	-0.11	0.785	27.22	
0.0227	-0.54	0.29	26.72	
0.034	-0.07	0.854	27.28	
0.0453	0.14	1.383	27.81	
0.0567	0.29	1.955	28.39	
0.068	0.36	2.309	28.74	
0.0793	0.44	2.734	29.16	
0.0907	0.44	2.763	29.19	
0.102	0.43	2.72	29.15	
0.1133	0.43	2.665	29.10	
0.1247	0.42	2.616	29.05	
0.136	0.41	2.573	29.00	Test initialization
0.1473	0.40	2.521	28.95	
0.1587	0.39	2.475	28.91	
0.17	0.39	2.429	28.86	
0.1813	0.38	2.386	28.82	
0.1927	0.37	2.346	28.78	
0.204	0.36	2.297	28.73	
0.2153	0.35	2.26	28.69	
0.2267	0.35	2.222	28.65	
0.2383	0.34	2.185	28.62	
0.2508	0.33	2.145	28.58	
0.264	0.32	2.105	28.54	
0.278	0.32	2.067	28.50	
0.2928	0.31	2.027	28.46	
0.3085	0.30	1.99	28.42	
0.3252	0.29	1.946	28.38	
0.3428	0.28	1.9	28.33	
0.3615	0.27	1.86	28.29	
0.3813	0.26	1.811	28.24	
0.4023	0.25	1.762	28.19	
0.4245	0.23	1.705	28.14	
0.448	0.22	1.659	28.09	
0.4728	0.21	1.604	28.03	
0.4992	0.20	1.578	28.01	
0.5272	0.18	1.498	27.93	
0.5568	0.16	1.44	27.87	
0.5882	0.14	1.386	27.82	
0.6213	0.12	1.331	27.76	
0.6565	0.11	1.274	27.70	
0.6938	0.08	1.213	27.64	
0.7333	0.06	1.156	27.59	
0.7752	0.04	1.095	27.53	
0.8195	0.02	1.038	27.47	
0.8665	-0.01	0.983	27.41	
0.9163	-0.03	0.926	27.36	
0.969	-0.06	0.868	27.30	
1.0248	-0.09	0.811	27.24	
1.084	-0.12	0.753	27.18	
1.1467	-0.16	0.696	27.13	
1.213	-0.19	0.644	27.07	
1.2833	-0.23	0.592	27.02	
1.3578	-0.27	0.541	26.97	
1.4368	-0.31	0.492	26.92	
1.5205	-0.35	0.443	26.87	
1.609	-0.40	0.397	26.83	
1.7028	-0.45	0.351	26.78	
1.8022	-0.51	0.311	26.74	
1.9075	-0.57	0.267	26.70	90% recovery
2.019	-0.63	0.233	26.66	
2.1372	-0.71	0.193	26.62	Test completion
2.2623	-0.79	0.161	26.59	
2.3948	-0.89	0.129	26.56	
2.5353	-1.00	0.101	26.53	
2.6842	-1.14	0.072	26.50	
2.8417	-1.34	0.046	26.48	
3.0083	-1.59	0.026	26.46	
3.175	-2.52	0.003	26.43	
3.3417	#NUM!	-0.012	26.42	
3.5083	#NUM!	-0.029	26.40	
3.675	#NUM!	-0.04	26.39	
3.8417	#NUM!	-0.055	26.38	
4.0083	#NUM!	-0.063	26.37	
4.175	#NUM!	-0.069	26.36	
4.3417	#NUM!	-0.078	26.35	
4.5083	#NUM!	-0.083	26.35	
4.675	#NUM!	-0.092	26.34	
4.8417	#NUM!	-0.095	26.34	

OW-946 (slug-out) Recovery vs. Time



OW-946 (slug-out) Recovery vs. Time



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:** 1553	**Observation Well No.:** OW946601T
Weather Conditions: Sunny Approx 60FT	
Method of Slug Withdrawl (circle one): (a) 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: 43.4ft below reference point	**Reference Point:** Permanent mark on top of casing
Length of Screened Section: 10 ft	**Depth interval of screened portion:** 30.4-40.4ft
Depth to Groundwater: 26.43 ft below reference point	

Groundwater Measurements Collected Prior to Slug Test

Depth to Groundwater	Date
26.39 (pre-Deadfoot)	11-14-06
26.53 (post-Deadfoot)	11-14-06
26.53 (DW KK)	11-14-06

Comments/Remarks

USED Transducer SN D00513
Hermit 3000
Set Transducer 35' below TOC
Transducer = 26.43'
vs. Static 26.43'
Offset 2.763
Final Hermit reading -0.095

In-Situ Inc. Hermit 3000

Report generated: 12/11/06 17:40:54
Report from file: P:\6468\2006 Projects\1472 North Anna COL\Slug Test Data\Raw data logger fil
DataMgr Version 3.71

Serial number: 00045369
Firmware Version 7.08
Unit name: HERMIT 3000

Test name: OW946OUT PAGE 1 OF 2

Test defined on: 11/14/06 16:52:41
Test started on: 11/14/06 16:58:12
Test stopped on: 11/14/06 17:03:10
Test extracted on: 11/14/06 18:01:29

Data gathered using Logarithmic testing
Maximum time between data points: 0.1667 Minutes.
Number of data samples: 79

TOTAL DATA SAMPLES 79

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
Referenced on: test start
Pressure head at reference: 8.405 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	16:58:12	0.0000	0.000	29.565
11/14/06	16:58:12	0.0113	0.785	29.565
11/14/06	16:58:13	0.0227	0.290	29.561
11/14/06	16:58:14	0.0340	0.854	29.559
11/14/06	16:58:14	0.0453	1.383	29.563
11/14/06	16:58:15	0.0567	1.955	29.563
11/14/06	16:58:16	0.0680	2.309	29.563
11/14/06	16:58:16	0.0793	2.734	29.561
11/14/06	16:58:17	0.0907	2.763	29.563
11/14/06	16:58:18	0.1020	2.720	29.563
11/14/06	16:58:18	0.1133	2.665	29.563
11/14/06	16:58:19	0.1247	2.616	29.563
11/14/06	16:58:20	0.1360	2.573	29.561
11/14/06	16:58:20	0.1473	2.521	29.563
'14/06	16:58:21	0.1587	2.475	29.563
/14/06	16:58:22	0.1700	2.429	29.563
11/14/06	16:58:22	0.1813	2.386	29.563
11/14/06	16:58:23	0.1927	2.346	29.563
11/14/06	16:58:24	0.2040	2.297	29.563
11/14/06	16:58:24	0.2153	2.260	29.565
11/14/06	16:58:25	0.2267	2.222	29.563

OW946 OUT PAGE 2 OF 2

11/14/06	16:58:26	0.2383	2.185	29.567
11/14/06	16:58:27	0.2508	2.145	29.563
11/14/06	16:58:27	0.2640	2.105	29.565
11/14/06	16:58:28	0.2780	2.067	29.563
11/14/06	16:58:29	0.2928	2.027	29.563
11/14/06	16:58:30	0.3085	1.990	29.561
11/14/06	16:58:31	0.3252	1.946	29.561
11/14/06	16:58:32	0.3428	1.900	29.563
11/14/06	16:58:33	0.3615	1.860	29.561
11/14/06	16:58:34	0.3813	1.811	29.563
11/14/06	16:58:36	0.4023	1.762	29.567
11/14/06	16:58:37	0.4245	1.705	29.565
11/14/06	16:58:38	0.4480	1.659	29.563
11/14/06	16:58:40	0.4728	1.604	29.563
11/14/06	16:58:41	0.4992	1.578	29.565
11/14/06	16:58:43	0.5272	1.498	29.565
11/14/06	16:58:45	0.5568	1.440	29.569
11/14/06	16:58:47	0.5882	1.386	29.563
11/14/06	16:58:49	0.6213	1.331	29.565
11/14/06	16:58:51	0.6565	1.274	29.565
11/14/06	16:58:53	0.6938	1.213	29.563
11/14/06	16:58:56	0.7333	1.156	29.565
11/14/06	16:58:58	0.7752	1.095	29.565
11/14/06	16:59:01	0.8195	1.038	29.567
11/14/06	16:59:03	0.8665	0.983	29.567
11/14/06	16:59:06	0.9163	0.926	29.563
11/14/06	16:59:10	0.9690	0.868	29.563
11/14/06	16:59:13	1.0248	0.811	29.565
11/14/06	16:59:17	1.0840	0.753	29.563
11/14/06	16:59:20	1.1467	0.696	29.565
11/14/06	16:59:24	1.2130	0.644	29.567
11/14/06	16:59:29	1.2833	0.592	29.563
11/14/06	16:59:33	1.3578	0.541	29.563
11/14/06	16:59:38	1.4368	0.492	29.567
11/14/06	16:59:43	1.5205	0.443	29.563
11/14/06	16:59:48	1.6090	0.397	29.565
11/14/06	16:59:54	1.7028	0.351	29.567
11/14/06	17:00:00	1.8022	0.311	29.567
11/14/06	17:00:06	1.9075	0.267	29.567
11/14/06	17:00:13	2.0190	0.233	29.565
11/14/06	17:00:20	2.1372	0.193	29.567
11/14/06	17:00:27	2.2623	0.161	29.567
11/14/06	17:00:35	2.3948	0.129	29.567
11/14/06	17:00:44	2.5353	0.101	29.563
11/14/06	17:00:53	2.6842	0.072	29.567
11/14/06	17:01:02	2.8417	0.046	29.565
11/14/06	17:01:12	3.0083	0.026	29.563
11/14/06	17:01:22	3.1750	0.003	29.567
11/14/06	17:01:32	3.3417	-0.012	29.565
11/14/06	17:01:42	3.5083	-0.029	29.563
11/14/06	17:01:52	3.6750	-0.040	29.569
11/14/06	17:02:02	3.8417	-0.055	29.565
11/14/06	17:02:12	4.0083	-0.063	29.569
11/14/06	17:02:22	4.1750	-0.069	29.565
11/14/06	17:02:32	4.3417	-0.078	29.569
11/14/06	17:02:42	4.5083	-0.083	29.567
11/14/06	17:02:52	4.6750	-0.092	29.565
11/14/06	17:03:02	4.8417	-0.095	29.567

MACTEC
engineering and constructing a better tomorrow

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

Well: OW-946
Test Date: 11/14/2006
Test Type: Recovery (slug out)
Test Name: OW-946-out2

Conducted by: Charles-Smith
Entered/date: WB/12-4-06
Checked/date: JCP by [signature] with permission 12/12/06

WELL DATA

SWL =	26.42	(ft BTOC)
WD =	45.90	(ft BTOC)
WD =	43.40	(ft BGS)
DTSP =	25.20	(ft BGS)
rc =	0.08	(ft)
n =	0.30	
rw =	0.35	(ft)
rc (adjusted) =	0.20	(ft)
Le =	10	(ft)
Lw =	16.48	(ft)
Le/rw =	28.57	
H =	17.88	(ft)

H is depth from SWL to top of bedrock as listed on boring logs

CALCULATION OF K

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

yo =	2.67	(ft) from plot
yt =	0.59	(ft) from plot
t =	1.40	(minutes) from plot
ln(Re/rw) =	2.56	
K =	8.2E+00	(ft/day)
K =	2.9E-03	(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=	2.56
Where: Lw = H;	
ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 =	2.78

Calculation of Coefficients

Value range for Le/rw from Table of Coefficients

Le/rw	A	B	C
25	2.4	0.31	1.9
30	2.5	0.35	2.1

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

28.57	2.47	0.34	2.04

Coefficients Table

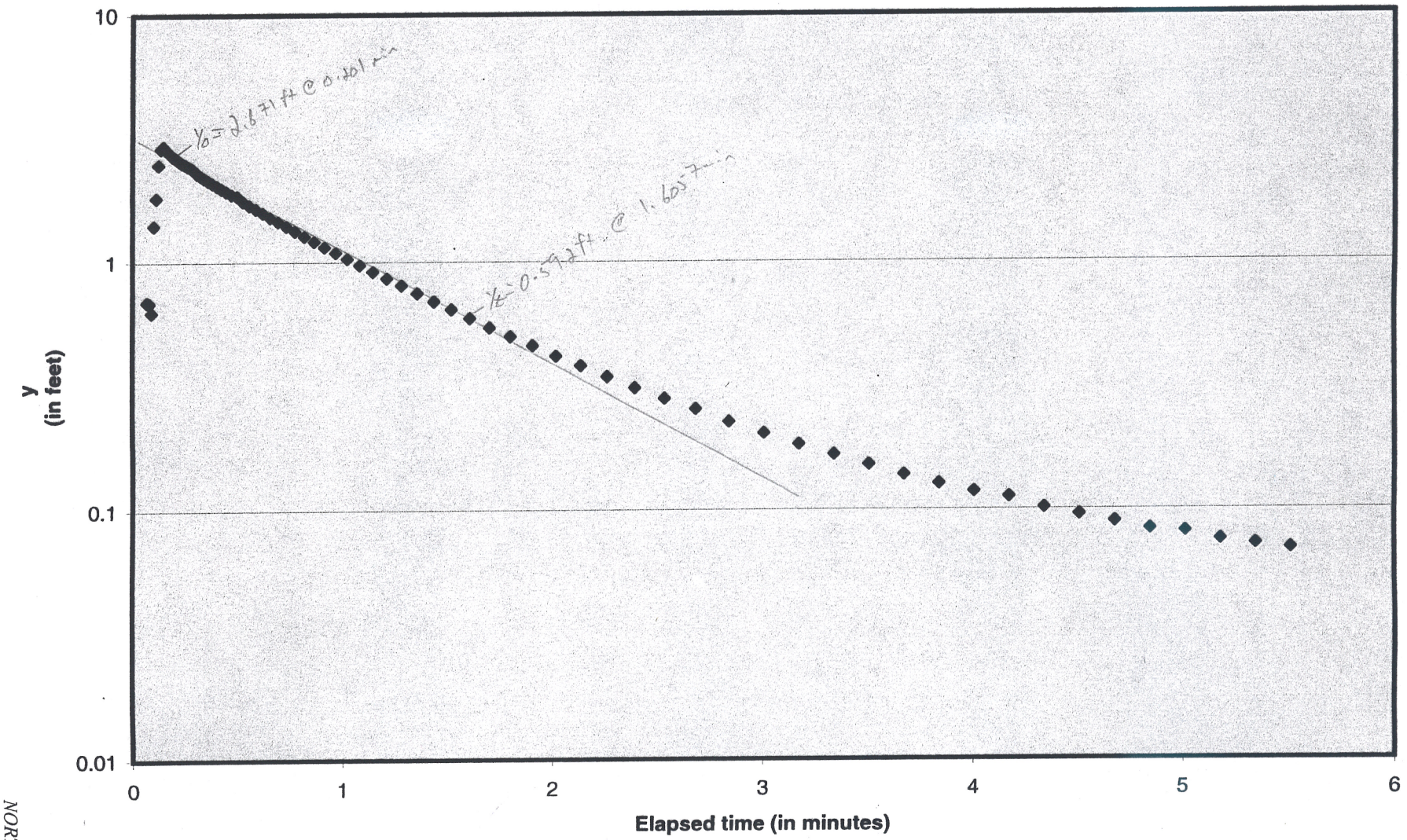
Le/rw	A	Le/rw	B	Le/rw	C
4	1.75	4	0.25	4	0.75
5	1.76	5	0.25	5	0.85
6	1.77	6	0.25	6	0.90
7	1.80	7	0.25	7	1.00
8	1.83	8	0.25	8	1.10
9	1.90	9	0.25	9	1.20
10	1.95	10	0.25	10	1.30
15	2.10	15	0.27	15	1.50
20	2.23	20	0.29	20	1.75
25	2.40	25	0.31	25	1.90
30	2.50	30	0.35	30	2.10
40	2.75	40	0.45	40	2.45
50	3.00	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

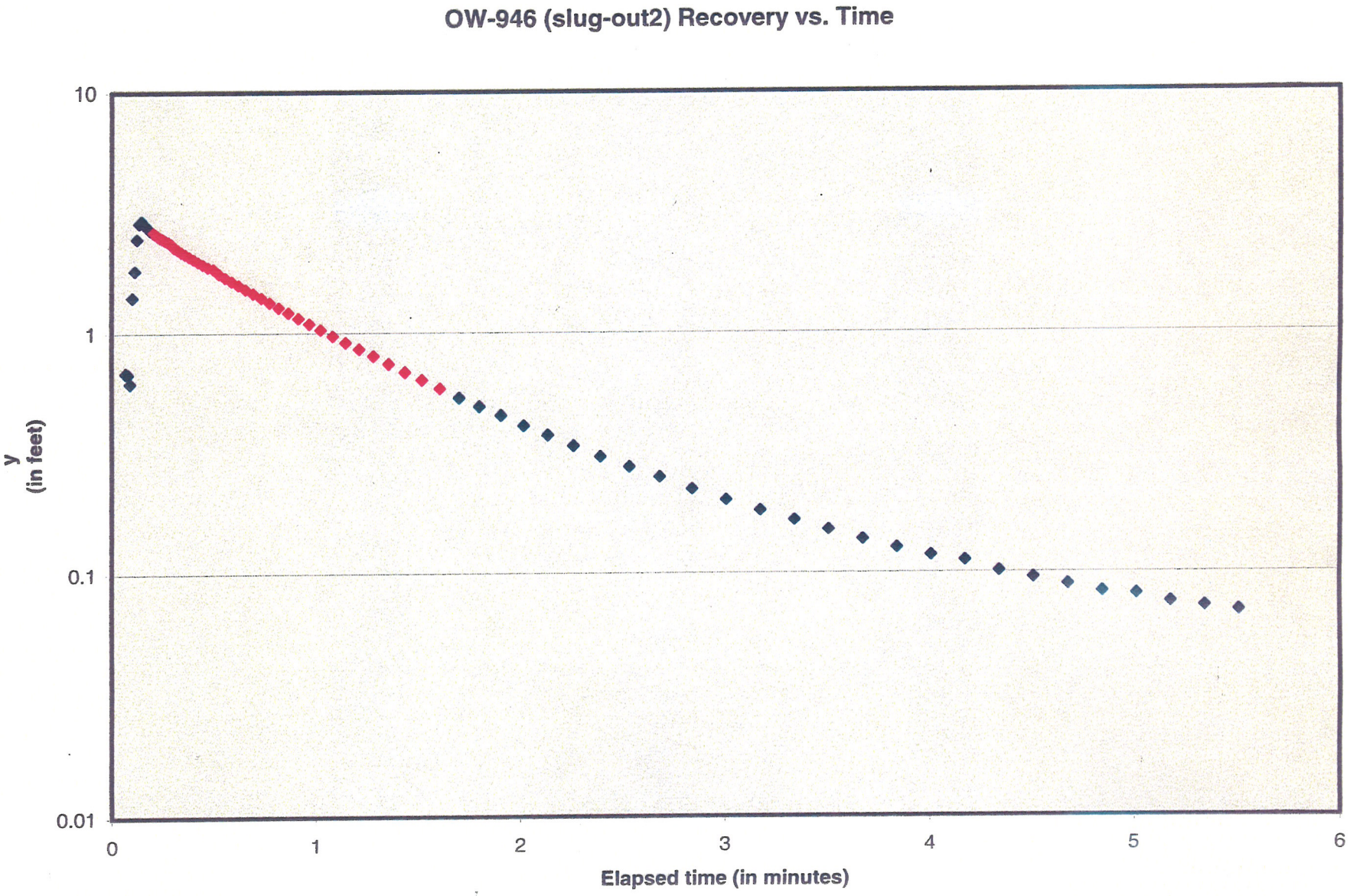
Reference: Bouwer(1989), Bouwer and Rice(1976)

TEST DATA

	Elapsed time (min)	Log y	y (ft)	WL (ft BTOC)
	0	#NUM!	0	26.42
	0.0112	-2.22	0.006	26.43
	0.0223	#NUM!	0	26.42
	0.0335	-2.52	0.003	26.42
	0.0447	#NUM!	0	26.42
	0.0558	#NUM!	0	26.42
	0.067	-0.16	0.69	27.11
	0.0782	-0.16	0.684	27.10
	0.0893	-0.20	0.627	27.05
	0.1005	0.15	1.412	27.83
	0.1117	0.26	1.832	28.25
	0.1228	0.40	2.501	28.92
	0.134	0.46	2.91	29.33
	0.1452	0.47	2.973	29.39
	0.1563	0.46	2.895	29.32
	0.1675	0.45	2.832	29.25
	0.1787	0.44	2.772	29.19
	0.1898	0.43	2.714	29.13
Test initialization	0.201	0.43	2.671	29.09
	0.2122	0.42	2.628	29.05
	0.2233	0.41	2.585	29.01
	0.235	0.41	2.547	28.97
	0.2475	0.40	2.513	28.93
	0.2607	0.39	2.473	28.89
	0.2747	0.39	2.438	28.86
	0.2895	0.38	2.392	28.81
	0.3052	0.36	2.306	28.73
	0.3218	0.35	2.26	28.68
	0.3395	0.34	2.208	28.63
	0.3582	0.33	2.159	28.58
	0.378	0.32	2.11	28.53
	0.399	0.31	2.056	28.48
	0.4212	0.30	2.004	28.42
	0.4447	0.29	1.952	28.37
	0.4695	0.28	1.898	28.32
	0.4958	0.27	1.866	28.29
	0.5238	0.25	1.777	28.20
	0.5535	0.23	1.714	28.13
	0.5848	0.22	1.653	28.07
	0.618	0.20	1.593	28.01
	0.6532	0.18	1.53	27.95
	0.6905	0.17	1.469	27.89
	0.73	0.15	1.406	27.83
	0.7718	0.13	1.343	27.76
	0.8162	0.11	1.279	27.70
	0.8632	0.08	1.216	27.64
	0.913	0.06	1.153	27.57
	0.9657	0.04	1.093	27.51
	1.0215	0.01	1.032	27.45
	1.0807	-0.01	0.972	27.39
	1.1433	-0.04	0.911	27.33
	1.2097	-0.07	0.857	27.28
	1.28	-0.10	0.802	27.22
	1.3545	-0.13	0.745	27.17
	1.4335	-0.16	0.69	27.11
	1.5172	-0.19	0.641	27.06
Test completion	1.6057	-0.23	0.592	27.01
	1.6995	-0.27	0.543	26.96
	1.7988	-0.30	0.5	26.92
	1.9042	-0.34	0.46	26.88
	2.0157	-0.38	0.417	26.84
	2.1338	-0.42	0.382	26.80
	2.259	-0.46	0.345	26.77
	2.3915	-0.51	0.311	26.73
90% recovery	2.532	-0.55	0.282	26.70
	2.6808	-0.59	0.256	26.68
	2.8383	-0.64	0.227	26.65
	3.005	-0.69	0.204	26.62
	3.1717	-0.74	0.184	26.60
	3.3383	-0.78	0.167	26.59
	3.505	-0.82	0.152	26.57
	3.6717	-0.86	0.138	26.56
	3.8383	-0.90	0.127	26.55
	4.005	-0.93	0.118	26.54
	4.1717	-0.95	0.112	26.53
	4.3383	-1.00	0.101	26.52
	4.505	-1.02	0.095	26.52
	4.6717	-1.05	0.089	26.51
	4.8383	-1.08	0.083	26.50
	5.005	-1.09	0.081	26.50

OW-946 (slug-out2) Recovery vs. Time




OW-946 (slug-out2) Recovery vs. Time
10
1
0.1
0.01
y
(in feet)
0
1
2
3
4
5
6
Elapsed time (in minutes)

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:** 1621	**Observation Well No.:**	OW946OUT2
Weather Conditions:	Sunny Approx 68°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:	43.4 ft below reference point	**Reference Point:**	Permanent mark on top of casing
Length of Screened Section:	10 ft	**Depth interval of screened portion:**	30.4-40.4 ft
Depth to Groundwater:	26.42 ft below reference point		

Groundwater Measurements Collected Prior to Slug Test

Depth to Groundwater	Date
26.39 (pre-Dehpnet)	11-14-06
26.53 (post-Dehpnet)	11-14-06
26.43 (OW946OUT)	11-14-06
26.44 (OW946IN2)	11-14-06

Comments/Remarks

11-14-06

USED Transducer SND00513
Hermit 3000
Set Transducer 35' below TOC.
Transducer = 26.41' vs. 26.42 static
OFFSet = 2.973
Final Hermit ready .118

In-Situ Inc. Hermit 3000

Report generated: 12/11/06 17:41:13
Report from file: P:\6468\2006 Projects\1472 North Anna COL\Slug Test Data\Raw data logger fil
DataMgr Version 3.71

Serial number: 00045369
Firmware Version 7.08
Unit name: HERMIT 3000

Test name: OW946out2 PAGE 1 OF 2

Test defined on: 11/14/06 17:23:29
Test started on: 11/14/06 17:23:59
Test stopped on: 11/14/06 17:29:31
Test extracted on: 11/14/06 18:03:07

Data gathered using Logarithmic testing
Maximum time between data points: 0.1667 Minutes.
Number of data samples: 83

TOTAL DATA SAMPLES 83

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
Referenced on: test start
Pressure head at reference: 8.580 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	17:23:59	0.0000	0.000	29.577
11/14/06	17:23:59	0.0112	0.006	29.575
11/14/06	17:24:00	0.0223	0.000	29.575
11/14/06	17:24:01	0.0335	0.003	29.575
11/14/06	17:24:01	0.0447	0.000	29.571
11/14/06	17:24:02	0.0558	0.000	29.575
11/14/06	17:24:03	0.0670	0.690	29.573
11/14/06	17:24:03	0.0782	0.684	29.575
11/14/06	17:24:04	0.0893	0.627	29.571
11/14/06	17:24:05	0.1005	1.412	29.571
11/14/06	17:24:05	0.1117	1.832	29.573
11/14/06	17:24:06	0.1228	2.501	29.575
11/14/06	17:24:07	0.1340	2.910	29.575
11/14/06	17:24:07	0.1452	2.973	29.575
11/14/06	17:24:08	0.1563	2.895	29.575
11/14/06	17:24:09	0.1675	2.832	29.575
11/14/06	17:24:09	0.1787	2.772	29.575
11/14/06	17:24:10	0.1898	2.714	29.575
11/14/06	17:24:11	0.2010	2.671	29.575
11/14/06	17:24:11	0.2122	2.628	29.569
11/14/06	17:24:12	0.2233	2.585	29.573

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11/14/06	17:24:13	0.2350	2.547	29.571
11/14/06	17:24:13	0.2475	2.513	29.569
11/14/06	17:24:14	0.2607	2.473	29.575
11/14/06	17:24:15	0.2747	2.438	29.575
11/14/06	17:24:16	0.2895	2.392	29.573
11/14/06	17:24:17	0.3052	2.306	29.573
14/06	17:24:18	0.3218	2.260	29.573
,14/06	17:24:19	0.3395	2.208	29.577
11/14/06	17:24:20	0.3582	2.159	29.571
11/14/06	17:24:21	0.3780	2.110	29.575
11/14/06	17:24:22	0.3990	2.056	29.573
11/14/06	17:24:24	0.4212	2.004	29.573
11/14/06	17:24:25	0.4447	1.952	29.573
11/14/06	17:24:27	0.4695	1.898	29.575
11/14/06	17:24:28	0.4958	1.866	29.573
11/14/06	17:24:30	0.5238	1.777	29.573
11/14/06	17:24:32	0.5535	1.714	29.573
11/14/06	17:24:34	0.5848	1.653	29.575
11/14/06	17:24:36	0.6180	1.593	29.573
11/14/06	17:24:38	0.6532	1.530	29.575
11/14/06	17:24:40	0.6905	1.469	29.577
11/14/06	17:24:42	0.7300	1.406	29.575
11/14/06	17:24:45	0.7718	1.343	29.575
11/14/06	17:24:47	0.8162	1.279	29.575
11/14/06	17:24:50	0.8632	1.216	29.575
11/14/06	17:24:53	0.9130	1.153	29.575
11/14/06	17:24:56	0.9657	1.093	29.575
11/14/06	17:25:00	1.0215	1.032	29.575
11/14/06	17:25:03	1.0807	0.972	29.575
11/14/06	17:25:07	1.1433	0.911	29.575
11/14/06	17:25:11	1.2097	0.857	29.575
11/14/06	17:25:15	1.2800	0.802	29.577
11/14/06	17:25:20	1.3545	0.745	29.577
11/14/06	17:25:25	1.4335	0.690	29.577
'14/06	17:25:30	1.5172	0.641	29.579
14/06	17:25:35	1.6057	0.592	29.575
11/14/06	17:25:40	1.6995	0.543	29.573
11/14/06	17:25:46	1.7988	0.500	29.577
11/14/06	17:25:53	1.9042	0.460	29.573
11/14/06	17:25:59	2.0157	0.417	29.579
11/14/06	17:26:07	2.1338	0.382	29.579
11/14/06	17:26:14	2.2590	0.345	29.581
11/14/06	17:26:22	2.3915	0.311	29.575
11/14/06	17:26:30	2.5320	0.282	29.579
11/14/06	17:26:39	2.6808	0.256	29.577
11/14/06	17:26:49	2.8383	0.227	29.577
11/14/06	17:26:59	3.0050	0.204	29.577
11/14/06	17:27:09	3.1717	0.184	29.579
11/14/06	17:27:19	3.3383	0.167	29.577
11/14/06	17:27:29	3.5050	0.152	29.581
11/14/06	17:27:39	3.6717	0.138	29.579
11/14/06	17:27:49	3.8383	0.127	29.577
11/14/06	17:27:59	4.0050	0.118	29.579
11/14/06	17:28:09	4.1717	0.112	29.579
11/14/06	17:28:19	4.3383	0.101	29.577
11/14/06	17:28:29	4.5050	0.095	29.581
11/14/06	17:28:39	4.6717	0.089	29.577
11/14/06	17:28:49	4.8383	0.083	29.577
11/14/06	17:28:59	5.0050	0.081	29.577
11/14/06	17:29:09	5.1717	0.075	29.579
11/14/06	17:29:19	5.3383	0.072	29.585
11/14/06	17:29:29	5.5050	0.069	29.583