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

Well: OW-947
Test Date: 11/13/2006
Test Type: Recovery (slug out)
Test Name: OW-947-out

Conducted by: Grimes & Charles-Smith
Entered/date: W 12/12-4-06
Checked/date: JCP by [illegible] with permission 12/12/06

WELL DATA

SWL =	18.02	(ft BTOC)
WD =	60.00	(ft BTOC)
WD =	58.00	(ft BGS)
DTSP =	41.00	(ft BGS)
rc =	0.08	(ft)
n =	0.30	
rw =	0.35	(ft)
rc (adjusted) =	0.08	(ft)
Le =	10	(ft)
Lw =	38.98	(ft)
Le/rw =	28.57	
H =	62.68	(ft)

H is depth from SWL to top of bedrock (no recovery zone) as listed on boring logs

CALCULATION OF K

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

yo =	2.92	(ft) from plot
yt =	0.74	(ft) from plot
t =	3.90	(minutes) from plot
ln(Re/rw) =	2.70	
K =	4.6E-01	(ft/day)
K =	1.6E-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= 2.70

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 3.33

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

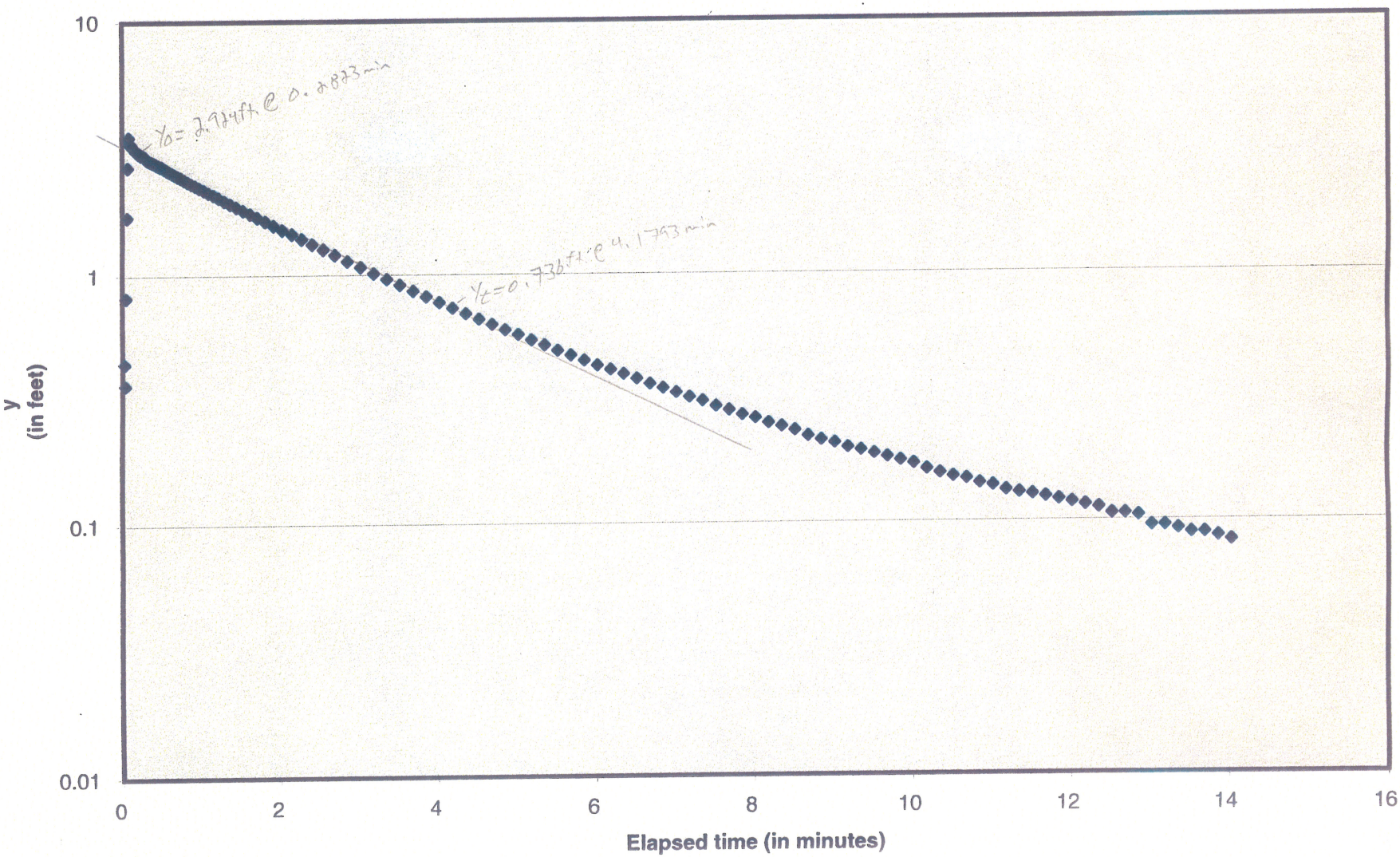
Le/rw	A	Le/rw	B	Le/rw	C
4	1.75	4	0.25	4	0.75
5	1.76	5	0.25	5	0.85
6	1.77	6	0.25	6	0.90
7	1.80	7	0.25	7	1.00
8	1.83	8	0.25	8	1.10
9	1.90	9	0.25	9	1.20
10	1.95	10	0.25	10	1.30
15	2.10	15	0.27	15	1.50
20	2.23	20	0.29	20	1.75
25	2.40	25	0.31	25	1.90
30	2.50	30	0.35	30	2.10
40	2.75	40	0.45	40	2.45
50	3.00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

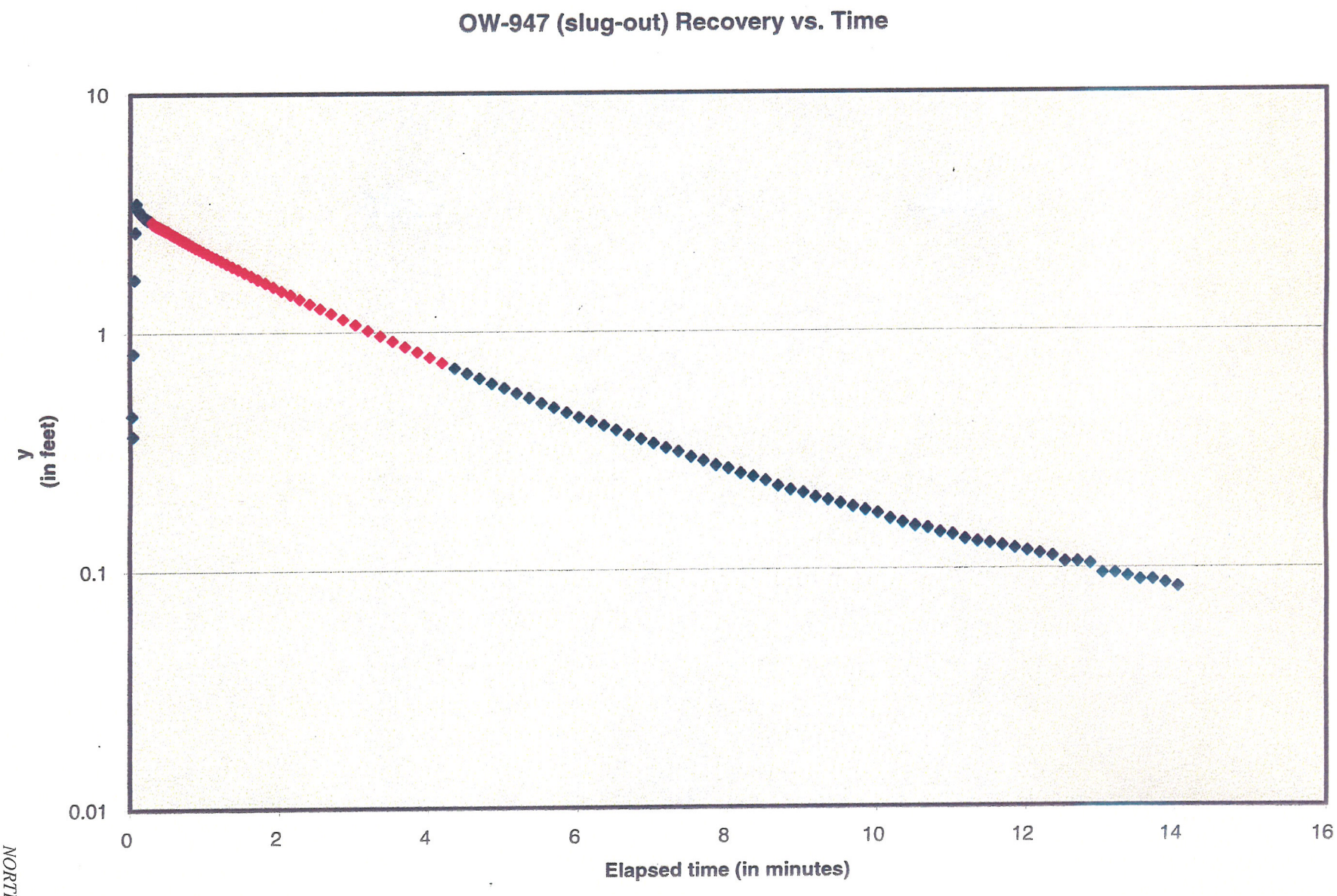
Reference: Bouwer(1989), Bouwer and Rice(1976)

TEST DATA

Elapsed time (min)	Log y	y (ft)	WL (ft BTOC)	
0	#NUM!	0	18.02	
0.011	-2.22	0.006	18.03	
0.022	-0.35	0.446	18.47	
0.033	-0.44	0.365	18.39	
0.044	-0.09	0.82	18.84	
0.055	0.23	1.691	19.71	
0.066	0.42	2.654	20.67	
0.077	0.54	3.485	21.51	
0.088	0.52	3.318	21.34	
0.099	0.52	3.293	21.31	
0.11	0.51	3.241	21.26	
0.121	0.51	3.218	21.24	
0.132	0.50	3.183	21.20	
0.143	0.50	3.149	21.17	
0.154	0.50	3.132	21.15	
0.165	0.49	3.088	21.11	
0.176	0.49	3.071	21.09	
0.187	0.48	3.045	21.07	
0.198	0.48	3.025	21.05	
0.209	0.48	3.014	21.03	
0.22	0.48	3.011	21.03	
0.231	0.47	2.976	21.00	
0.2427	0.47	2.979	21.00	
0.2552	0.47	2.959	20.98	
0.2683	0.47	2.945	20.97	
0.2823	0.47	2.924	20.94	Test initialization
0.2972	0.46	2.873	20.89	
0.3128	0.46	2.855	20.88	
0.3295	0.45	2.832	20.85	
0.3472	0.45	2.812	20.83	
0.3658	0.45	2.795	20.82	
0.3857	0.44	2.772	20.79	
0.4067	0.44	2.752	20.77	
0.4288	0.44	2.729	20.75	
0.4523	0.43	2.703	20.72	
0.4772	0.43	2.68	20.70	
0.5035	0.43	2.669	20.69	
0.5315	0.42	2.623	20.64	
0.5612	0.41	2.594	20.61	
0.5925	0.41	2.559	20.58	
0.6257	0.40	2.525	20.55	
0.6608	0.40	2.487	20.51	
0.6982	0.39	2.453	20.47	
0.7377	0.38	2.416	20.44	
0.7795	0.38	2.372	20.39	
0.8238	0.37	2.332	20.35	
0.8708	0.36	2.289	20.31	
0.9207	0.35	2.249	20.27	
0.9733	0.34	2.203	20.22	
1.0292	0.33	2.157	20.18	
1.0883	0.32	2.108	20.13	
1.151	0.31	2.062	20.08	
1.2173	0.30	2.01	20.03	
1.2877	0.29	1.958	19.98	
1.3622	0.28	1.904	19.92	
1.4412	0.27	1.852	19.87	
1.5248	0.25	1.797	19.82	
1.6133	0.24	1.74	19.76	
1.7072	0.23	1.682	19.70	
1.8065	0.21	1.625	19.65	
1.9118	0.19	1.564	19.58	
2.0233	0.18	1.504	19.52	
2.1415	0.16	1.449	19.47	
2.2667	0.14	1.386	19.41	
2.3992	0.12	1.323	19.34	
2.5397	0.10	1.262	19.28	
2.6885	0.08	1.202	19.22	
2.846	0.06	1.136	19.16	
3.0127	0.03	1.076	19.10	
3.1793	0.01	1.015	19.04	
3.346	-0.02	0.963	18.98	
3.5127	-0.04	0.912	18.93	
3.6793	-0.06	0.863	18.88	
3.846	-0.09	0.82	18.84	
4.0127	-0.11	0.776	18.80	
4.1793	-0.13	0.736	18.76	Test completion
4.346	-0.16	0.699	18.72	
4.5127	-0.18	0.664	18.68	
4.6793	-0.20	0.633	18.65	
4.846	-0.22	0.601	18.62	

OW-947 (slug-out) Recovery vs. Time




OW-947 (slug-out) Recovery vs. Time
y
(in feet)
10
1
0.1
0.01
0
2
4
6
8
10
12
14
16
Elapsed time (in minutes)