Analysis of the RU Rock Hill Aquifer Test
Floridan Aquifer, Walton County, Florida

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Northwest Florida Water Management District

INTRODUCTION

During late 1997 and early 1998, Regional Utilities, Inc. (RU) conducted aquifer testing activities at a site in Walton County. The site is located immediately adjacent to US Highway 331, about seven miles north of Freeport. The test-well configuration consisted of a 16-inch diameter production well (PW, NWF_ID 7250), three four-inch diameter observation wells (OB-3 [7184], OB-1 [7185] and OB-2 [7186]), and a two-inch diameter surficial aquifer observation well. Well construction details are given in Figure 1. Testing at the site was conducted in two phases. Jim Stidham and Associates, Inc. (JSA) conducted a 72-hour, multi-well aquifer test at the site over December 17, 18 and 19, 1997 (Test #1). Data from all three Floridan Aquifer observation wells were available for analysis. Subsequent to this test, wells PW and OB-3 were deepened (Figure 2). A second 24-hour APT was conducted at the site over February 26 and 27, 1998 (Test #2). For Test #2, only data from well OB-3 were available for analysis. This report describes results of an APT re-analysis conducted by the Northwest Florida Water Management District.

TEST ANALYSIS AND RESULTS

The aquifer test data were analyzed using AquiferWin32 propriety software developed by Environmental Simulations, Inc. Time-drawdown data from the two tests were preliminarily compared to type curves generated by several analytical models (Theis, Hantush-Jacobs [1955], Hantush [1961], Hantush [1964]). Based on this analysis, the analytical model which appeared to best fit the observed time-drawdown data was Hantush [1961]. This is the confined, partial penetration model, which incorporates the effect of various vertical to horizontal anisotropy ratios (K_z/K_r). Results obtained from the Hantush (1961) analytical model are given below.

TEST #1

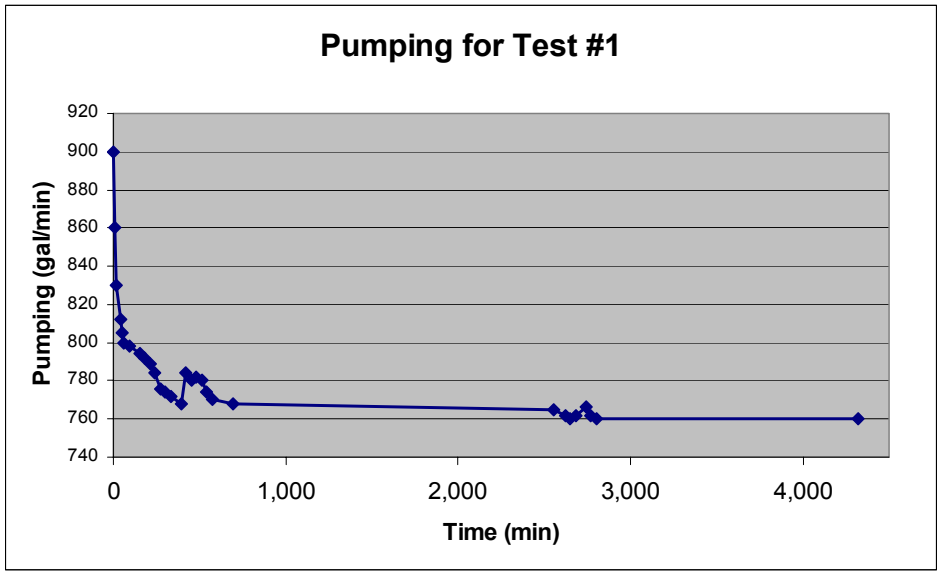
After 72 hours of pumping, the production well had 48.3 ft of drawdown. This yielded a specific capacity of 15.9 gal/min/ft. Based on specific capacity, the transmissivity was estimated as 4,200 ft2/d. Transmissivity and storativity estimates from Test #1 are given below. The estimated aquifer thickness is 530 ft. Time/drawdown data were analyzed assuming a constant discharge of 770 gal/min.

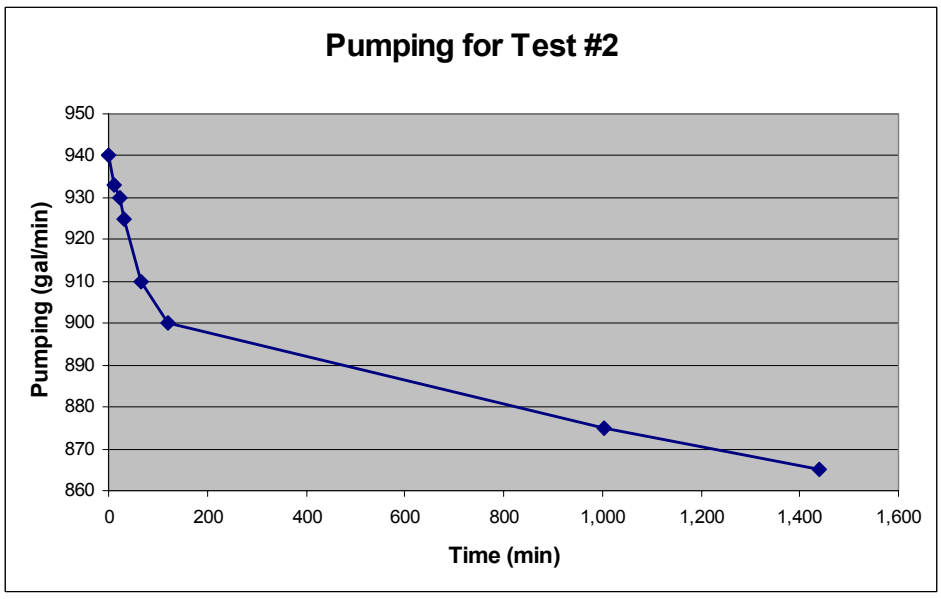
	r (ft)	T (ft2/d)	S (dimensionless)	Kz/Kr (dimensionless)
OB-2	90	9800	0.00069	0.01
OB-1	250	8000	0.00032	0.01
OB-3	500	7500	0.00017	0.01

TEST #2

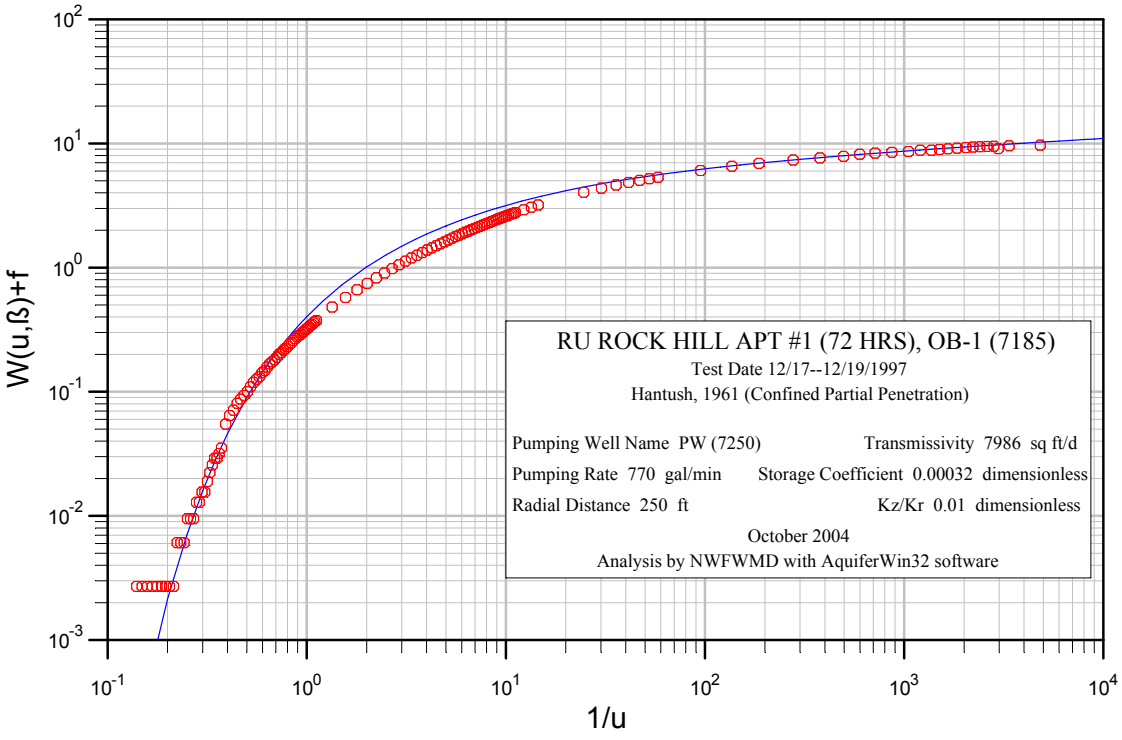
After 24 hours of pumping, the deepened production well had 48.5 ft of drawdown. The specific capacity increased slightly to 18.4 gal/min/ft. This increased the estimated transmissivity to 4,900 ft2/d. Transmissivity and storativity obtained from OB-3 time/drawdown data are given below. Time/drawdown data were analyzed assuming a constant discharge of 880 gal/min.

	r (ft)	T (ft2/d)	S (dimensionless)	Kz/Kr (dimensionless)
OB-3	500	6900	0.00016	0.01

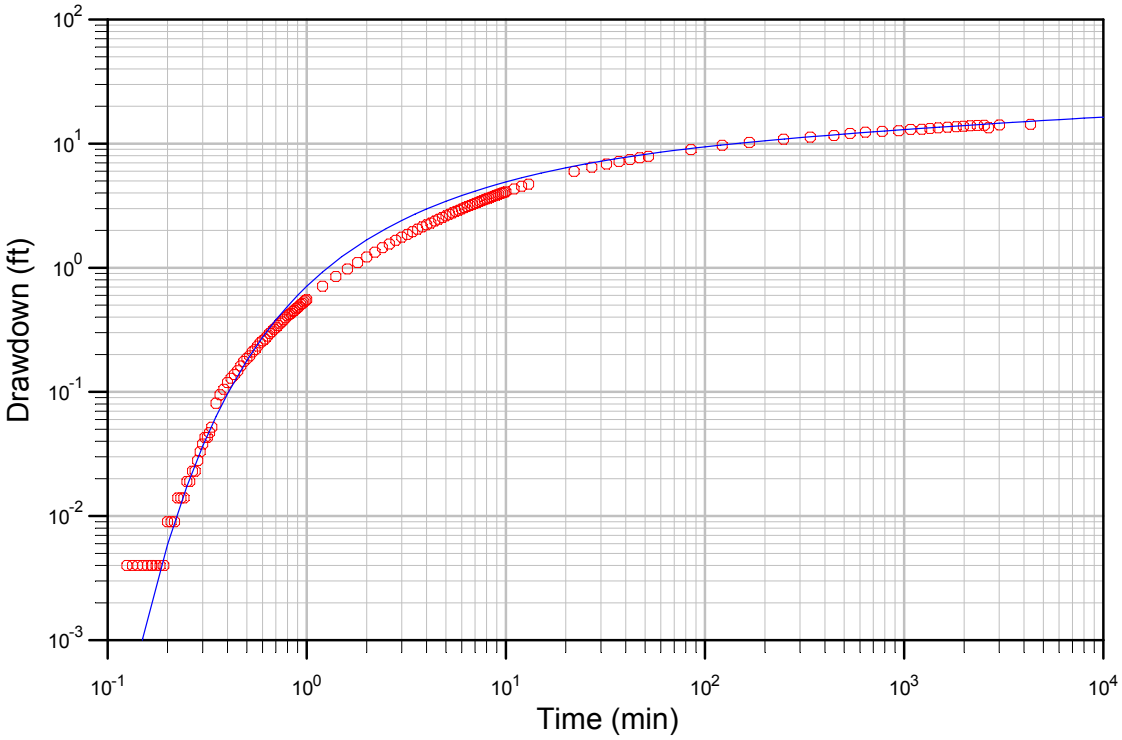




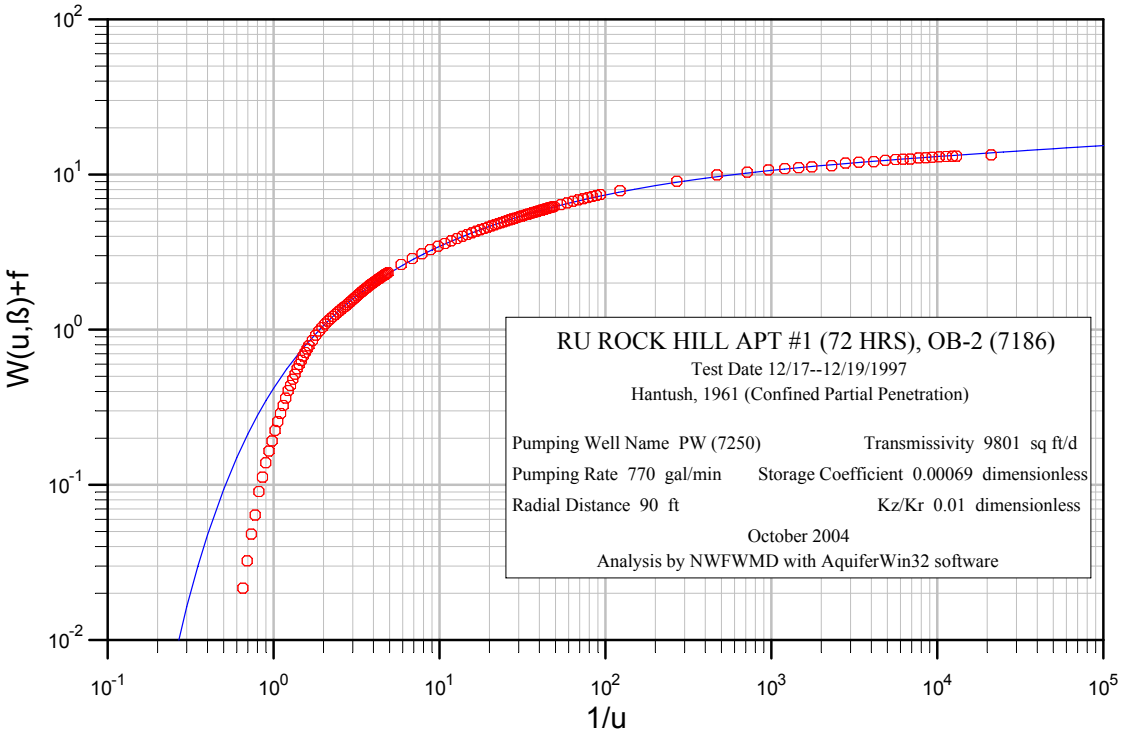
Hantush, 1961



Predicted Well Response



Hantush, 1961



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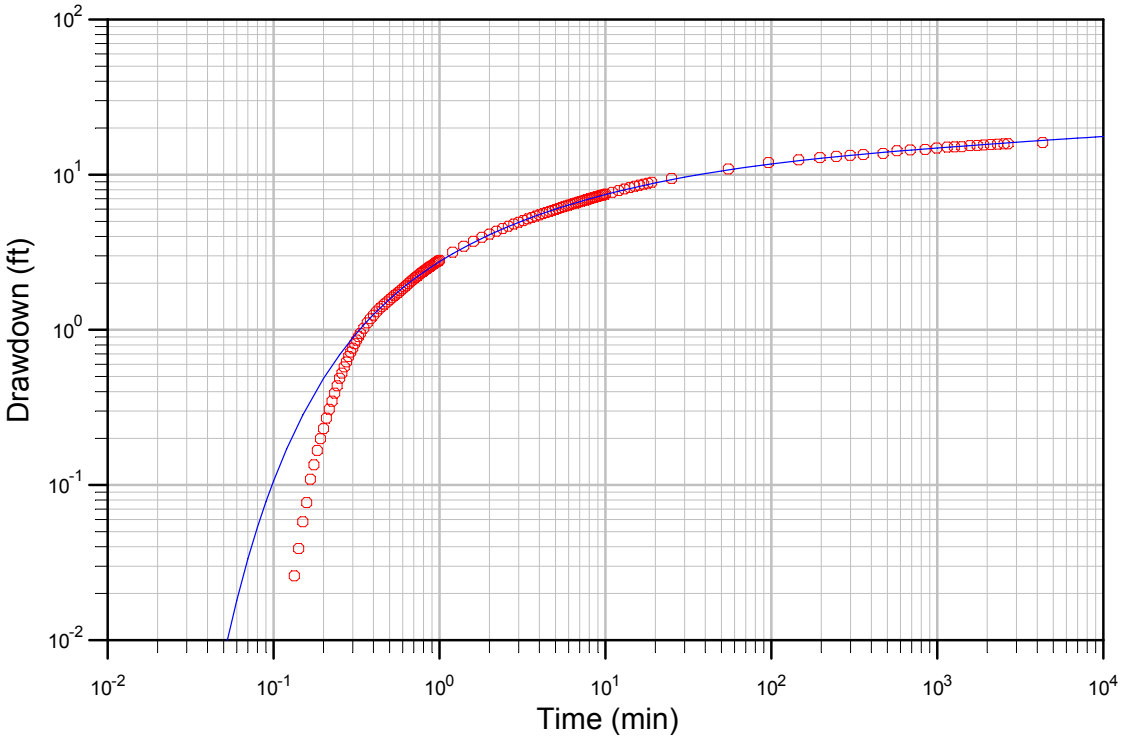
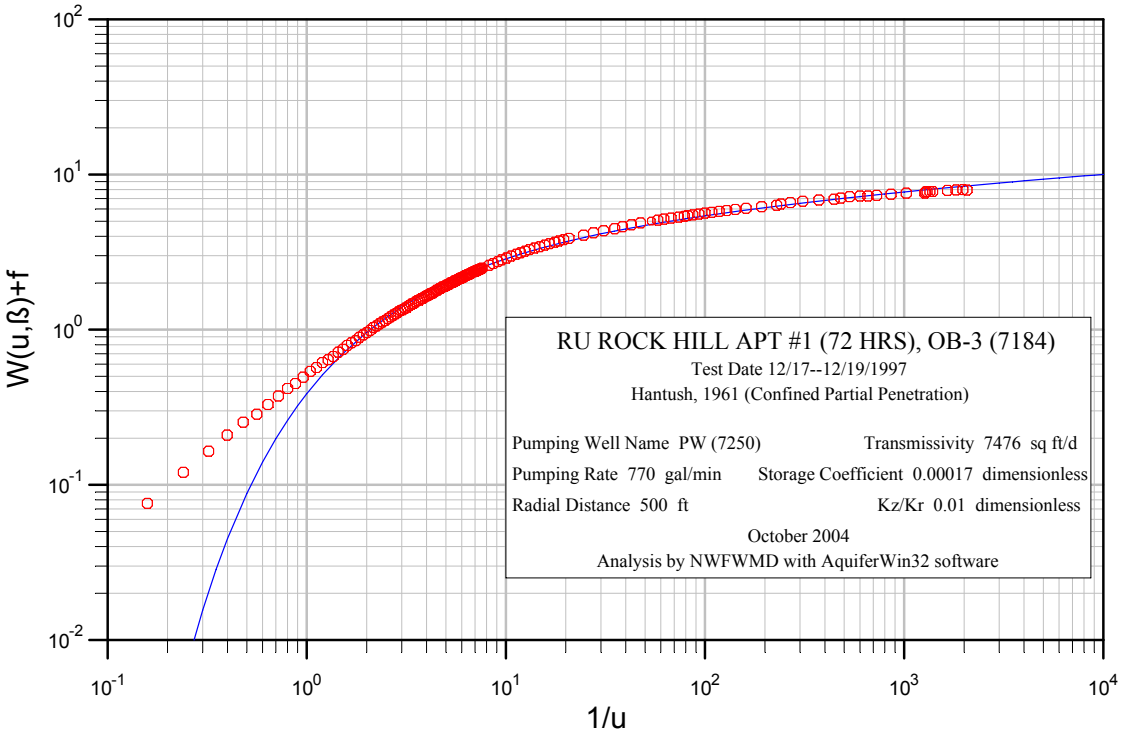


Hantush, 1961



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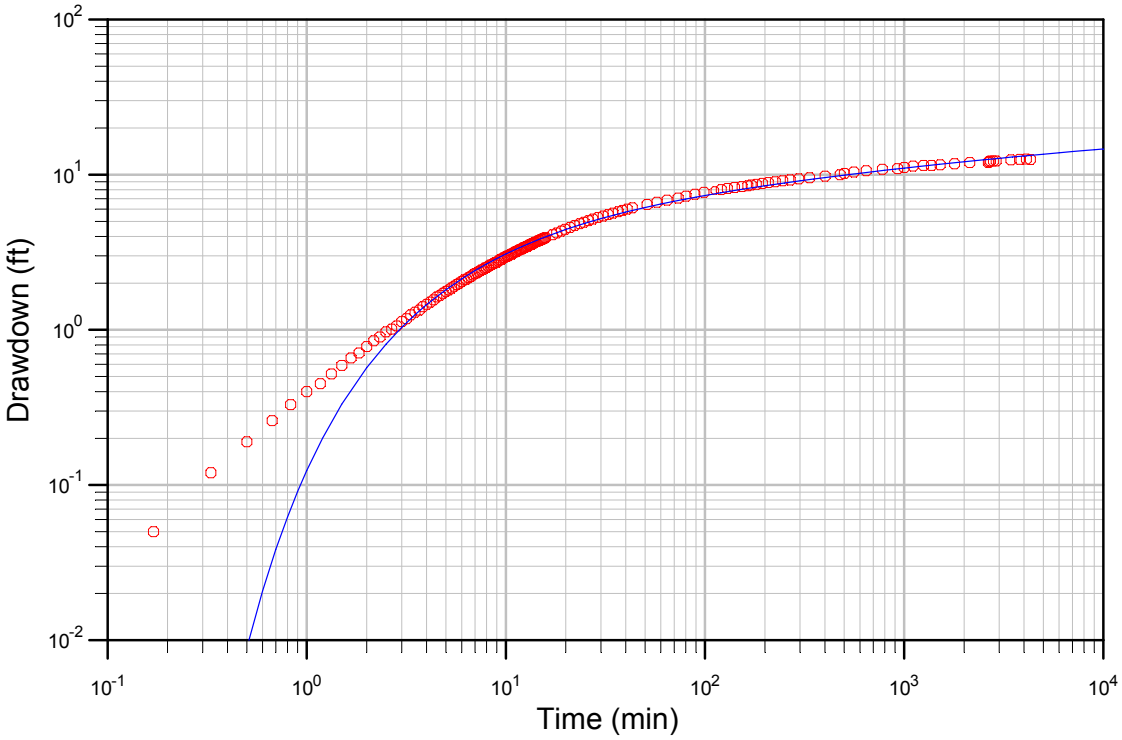
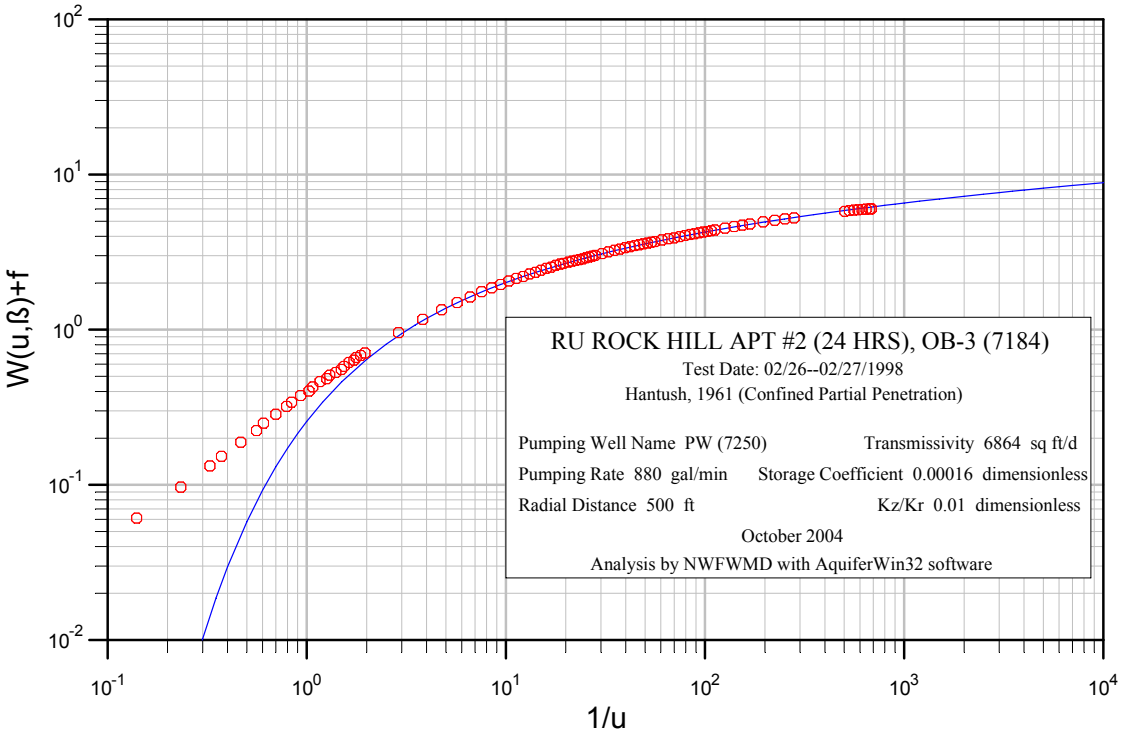
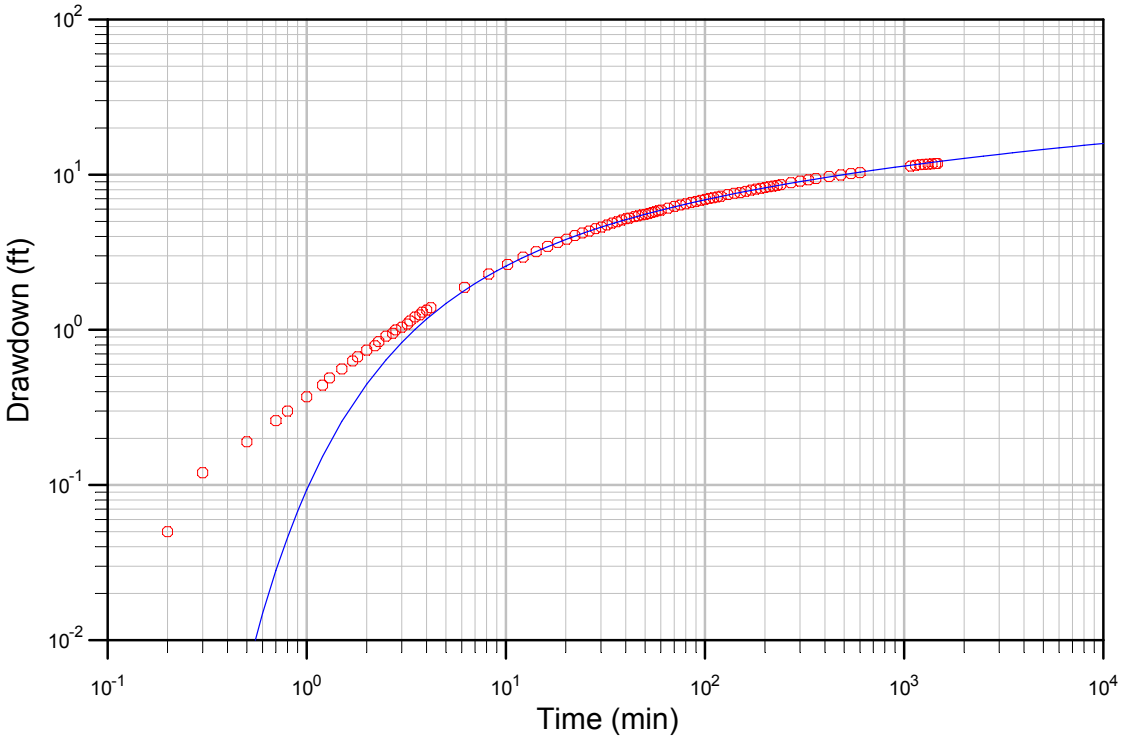


Hantush, 1961



Predicted Well Response



RU Rock Hill Floridan Aquifer System APT
Test date: 12/17/97--12/19/97

Production Well NWF_ID	pumpage rate (gal/min)	radial distance (ft)	Observation Well NWF_ID				
7250	770	90	**7186**				
elapsed time (min)	**drawdown (ft)**	**elapsed time (min)**	**drawdown (ft)**	**elapsed time (min)**	**drawdown (ft)**	**elapsed time (min)**	**drawdown (ft)**
0.12	0.00	0.57	1.74	3.8	5.41	19	8.931
0.13	0.01	0.58	1.80	4.0	5.51	25	9.462
0.13	0.03	0.60	1.84	4.2	5.61	55	10.89
0.14	0.04	0.62	1.89	4.4	5.71	96	11.97
0.15	0.06	0.63	1.94	4.6	5.80	146	12.45
0.16	0.08	0.65	1.99	4.8	5.89	196	12.89
0.17	0.11	0.67	2.04	5.0	5.97	246	13.12
0.18	0.14	0.68	2.08	5.2	6.06	298	13.32
0.18	0.17	0.70	2.13	5.4	6.14	358	13.49
0.19	0.20	0.72	2.17	5.6	6.22	471	13.72
0.20	0.23	0.73	2.22	5.8	6.29	571	14.26
0.21	0.27	0.75	2.26	6.0	6.36	687	14.45
0.22	0.31	0.77	2.31	6.2	6.44	845	14.56
0.23	0.35	0.78	2.35	6.4	6.51	992	14.85
0.23	0.39	0.80	2.39	6.6	6.57	1146	15.05
0.24	0.44	0.82	2.42	6.8	6.64	1268	15.1
0.25	0.49	0.83	2.46	7.0	6.70	1404	15.14
0.26	0.53	0.85	2.50	7.2	6.76	1571	15.39
0.27	0.58	0.87	2.54	7.4	6.82	1739	15.44
0.28	0.62	0.88	2.57	7.6	6.88	1901	15.55
0.28	0.67	0.90	2.60	7.8	6.93	2095	15.65
0.29	0.72	0.92	2.64	8.0	6.99	2307	15.74
0.30	0.76	0.93	2.68	8.2	7.04	2521	15.79
0.31	0.82	0.95	2.71	8.4	7.10	2664	15.82
0.32	0.86	0.97	2.74	8.6	7.15	4316	16.12
0.33	0.90	0.98	2.78	8.8	7.20		
0.33	0.95	1.0	2.81	9.0	7.25		
0.35	1.03	1.2	3.17	9.2	7.31		
0.37	1.11	1.4	3.46	9.4	7.35		
0.38	1.18	1.6	3.72	9.6	7.40		
0.40	1.24	1.8	3.95	9.8	7.45		
0.42	1.31	2.0	4.15	10	7.49		
0.43	1.37	2.2	4.33	11	7.70		
0.45	1.42	2.4	4.50	12	7.90		
0.47	1.47	2.6	4.65	13	8.09		
0.48	1.51	2.8	4.81	14	8.26		
0.50	1.57	3.0	4.94	15	8.41		
0.52	1.61	3.2	5.06	16	8.55		
0.53	1.66	3.4	5.19	17	8.69		
0.55	1.70	3.6	5.30	18	8.82		

RU Rock Hill Floridan Aquifer System APT
Test date: 12/17/97--12/19/97

Production Well NWF_ID	pumpage rate (gal/min)	radial distance (ft)	Observation Well NWF_ID
7250	770	250	**7185**

elapsed time (min)	drawdown (ft)	elapsed time (min)	drawdown (ft)	elapsed time (min)	drawdown (ft)	elapsed time (min)	drawdown (ft)
0.08	0.000	0.47	0.16	2.6	1.56	13	4.72
0.08	0.000	0.48	0.18	2.8	1.67	22	5.98
0.09	0.000	0.50	0.19	3	1.77	27	6.46
0.10	0.000	0.52	0.20	3.2	1.86	32	6.85
0.11	0.000	0.53	0.21	3.4	1.95	37	7.19
0.12	0.000	0.55	0.22	3.6	2.05	42	7.45
0.13	0.004	0.57	0.23	3.8	2.13	47	7.69
0.13	0.004	0.58	0.25	4	2.22	52	7.90
0.14	0.004	0.60	0.26	4.2	2.30	85	8.95
0.15	0.004	0.62	0.27	4.4	2.38	122	9.69
0.16	0.004	0.63	0.28	4.6	2.46	167	10.22
0.17	0.004	0.65	0.30	4.8	2.55	248	10.86
0.17	0.004	0.67	0.31	5	2.62	338	11.30
0.18	0.004	0.68	0.32	5.2	2.70	444	11.63
0.18	0.004	0.70	0.33	5.4	2.77	535	12.09
0.19	0.004	0.72	0.34	5.6	2.85	639	12.37
0.20	0.009	0.73	0.36	5.8	2.91	776	12.54
0.21	0.009	0.75	0.37	6	2.98	940	12.71
0.22	0.009	0.77	0.38	6.2	3.05	1078	13.02
0.23	0.014	0.78	0.40	6.4	3.11	1226	13.05
0.23	0.014	0.80	0.41	6.6	3.18	1348	13.24
0.24	0.014	0.82	0.42	6.8	3.24	1483	13.39
0.25	0.019	0.83	0.43	7	3.30	1650	13.55
0.26	0.019	0.85	0.44	7.2	3.36	1825	13.70
0.27	0.023	0.87	0.45	7.4	3.42	1983	13.81
0.28	0.023	0.88	0.47	7.6	3.48	2148	13.93
0.28	0.028	0.90	0.48	7.8	3.53	2332	14.00
0.29	0.033	0.92	0.49	8	3.59	2527	14.05
0.30	0.038	0.93	0.51	8.2	3.64	2653	13.43
0.31	0.043	0.95	0.52	8.4	3.70	3012	14.15
0.32	0.043	0.97	0.53	8.6	3.75	4316	14.31
0.33	0.047	0.98	0.54	8.8	3.81		
0.33	0.052	1	0.55	9	3.86		
0.35	0.081	1.2	0.71	9.2	3.91		
0.37	0.095	1.4	0.85	9.4	3.96		
0.38	0.105	1.6	0.98	9.6	4.01		
0.40	0.119	1.8	1.10	9.8	4.05		
0.42	0.129	2	1.22	10	4.10		
0.43	0.138	2.2	1.34	11	4.32		
0.45	0.148	2.4	1.45	12	4.53		

RU Rock Hill Floridan Aquifer System APT
Test date: 12/17/97--12/19/97

Production Well NWF_ID	pumpage rate (gal/min)	radial distance (ft)	Observation Well NWF_ID
7250	770	500	**7184**

elapsed time (min)	drawdown (ft)	elapsed time (min)	drawdown (ft)	elapsed time (min)	drawdown (ft)	elapsed time (min)	Drawdown (ft)
0.17	0.05	6.83	2.26	13.5	3.58	121	8.02
0.33	0.12	7	2.31	13.7	3.6	130	8.14
0.5	0.19	7.17	2.33	13.8	3.63	141	8.26
0.67	0.26	7.33	2.38	14.0	3.67	154	8.38
0.83	0.33	7.5	2.43	14.3	3.72	164	8.49
1	0.4	7.67	2.45	14.5	3.74	171	8.59
1.17	0.45	7.83	2.5	14.7	3.77	181	8.66
1.33	0.52	8	2.52	14.8	3.79	194	8.78
1.5	0.59	8.17	2.57	15.0	3.81	208	8.89
1.67	0.66	8.33	2.61	15.2	3.84	226	9.01
1.83	0.71	8.5	2.64	15.3	3.86	246	9.13
2	0.78	8.67	2.68	15.5	3.88	268	9.25
2.17	0.85	8.83	2.71	15.7	3.91	296	9.39
2.33	0.9	9	2.73	15.8	3.93	335	9.55
2.5	0.97	9.17	2.78	17.2	4.1	401	9.79
2.67	1.01	9.33	2.83	18.0	4.21	477	10
2.83	1.06	9.5	2.85	19.0	4.33	501	10.19
3	1.13	9.67	2.9	19.8	4.45	559	10.4
3.17	1.18	9.83	2.92	21.0	4.57	645	10.61
3.33	1.25	10.0	2.97	22.2	4.71	777	10.82
3.5	1.3	10.2	2.99	23.5	4.83	927	10.94
3.67	1.34	10.3	3.01	24.7	4.94	1001	11.13
3.83	1.41	10.5	3.06	26.0	5.06	1109	11.36
4	1.46	10.7	3.08	27.3	5.18	1251	11.46
4.17	1.51	10.8	3.11	29.0	5.3	1371	11.46
4.33	1.56	11.0	3.16	30.8	5.41	1517	11.57
4.5	1.63	11.2	3.18	32.7	5.53	1791	11.76
4.67	1.67	11.3	3.2	34.5	5.65	2137	11.97
4.83	1.72	11.5	3.25	36.7	5.77	2649	11.97
5	1.77	11.7	3.27	38.5	5.88	2671	12.16
5.17	1.81	11.8	3.3	40.7	6	2715	12.27
5.33	1.86	12.0	3.32	43.2	6.12	2807	12.27
5.5	1.91	12.2	3.37	51.2	6.42	2899	12.27
5.67	1.96	12.3	3.39	57.3	6.64	3439	12.46
5.83	2	12.5	3.41	64.5	6.85	3799	12.55
6	2.05	12.7	3.44	73.3	7.06	4111	12.6
6.17	2.1	12.8	3.46	80.3	7.27	4307	12.53
6.33	2.12	13.0	3.51	89.0	7.48		
6.5	2.17	13.2	3.53	98.8	7.69		
6.67	2.21	13.3	3.56	112.0	7.91		

RU Rock Hill Floridan Aquifer System APT
Test date: 02/26/98--
02/27/98

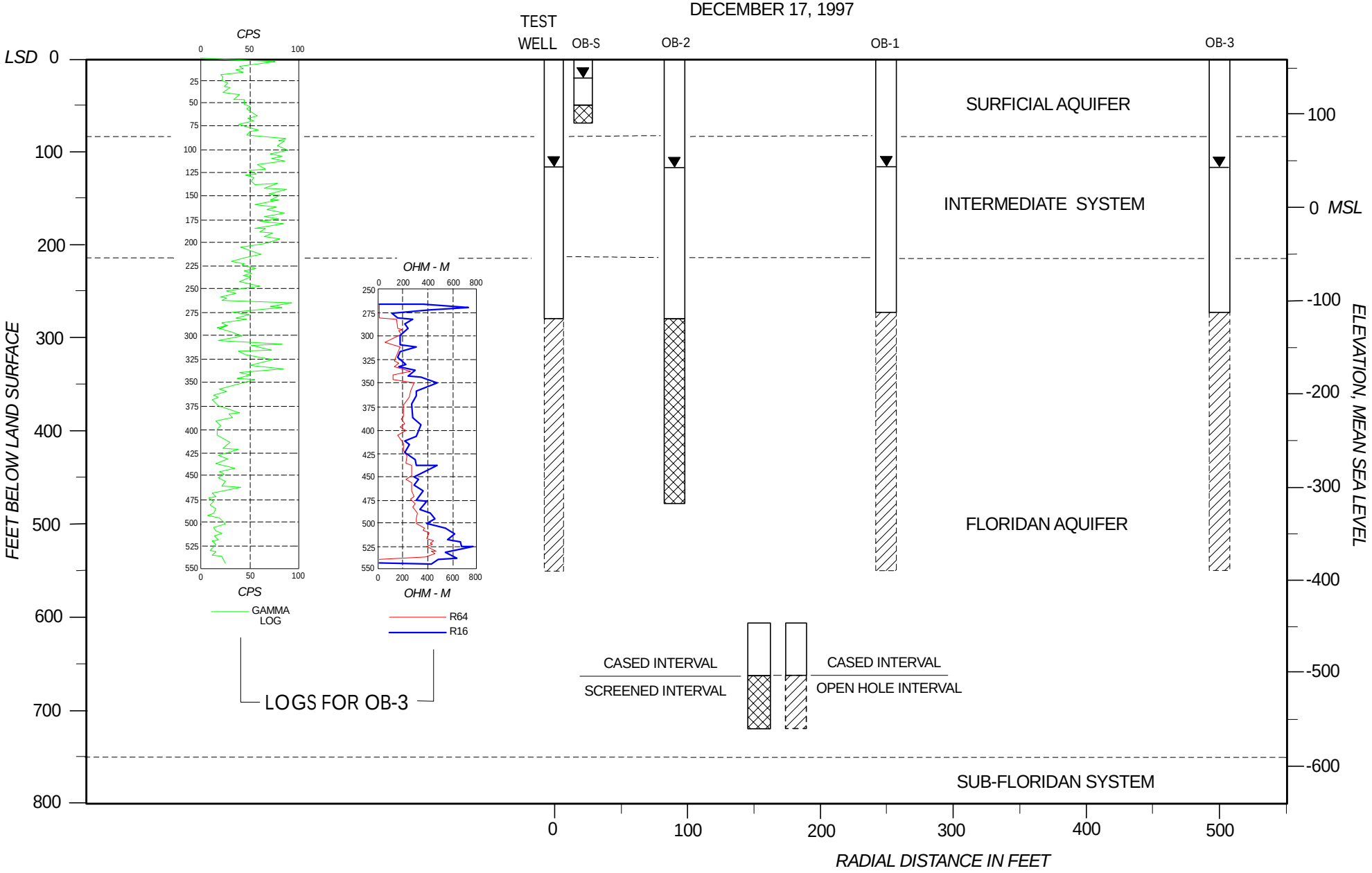
Production Well NWF_ID	pumpage rate (gal/min)	radial distance (ft)	Observation Well NWF_ID		
7250	880	500	**7184**		
elapsed time (min)	**drawdown (ft)**	**elapsed time (min)**	**drawdown (ft)**	**elapsed time (min)**	**drawdown (ft)**
0.2	0.05	36	4.97	360	9.43
0.3	0.12	38	5.11	420	9.73
0.5	0.19	40	5.2	480	9.96
0.7	0.26	42	5.25	540	10.17
0.8	0.3	44	5.36	600	10.31
1	0.37	46	5.43	1080	11.37
1.2	0.44	48	5.5	1140	11.49
1.3	0.49	50	5.55	1200	11.6
1.5	0.56	52	5.62	1260	11.65
1.7	0.63	54	5.71	1320	11.69
1.8	0.67	56	5.78	1380	11.74
2	0.74	58	5.85	1440	11.79
2.2	0.79	60	5.92	1468	11.81
2.3	0.84	65	6.08		
2.5	0.91	70	6.24		
2.7	0.95	75	6.38		
2.8	1	80	6.49		
3	1.04	85	6.63		
3.2	1.09	90	6.73		
3.3	1.14	95	6.84		
3.5	1.21	100	6.93		
3.7	1.25	105	7.03		
3.8	1.3	110	7.1		
4	1.34	115	7.19		
4.2	1.39	120	7.26		
6.2	1.88	130	7.44		
8.2	2.29	140	7.58		
10	2.64	150	7.67		
12	2.94	160	7.81		
14	3.19	170	7.95		
16	3.45	180	8.07		
18	3.66	190	8.16		
20	3.84	200	8.27		
22	4.05	210	8.37		
24	4.21	220	8.44		
26	4.33	230	8.53		
28	4.49	240	8.62		
30	4.6	270	8.87		
32	4.74	300	9.08		
34	4.88	330	9.27		

REGIONAL UTILITIES ROCK HILL AQUIFER TEST #1

SEC 2 - T1N - R19W

WALTON COUNTY, FLORIDA

DECEMBER 17, 1997



REGIONAL UTILITIES ROCK HILL AQUIFER TEST #2

SEC 2 - T1N - R19W

WALTON COUNTY, FLORIDA

FEBRUARY 26, 1998