Analysis of the WRP #2 Owl's Head APT
Floridan Aquifer, Walton County, Florida

November 2004

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Northwest Florida Water Management District

INTRODUCTION

During early 1998, WRP, Inc. conducted aquifer testing activities at a site in Walton County located about three miles east of US Highway 331 and about seven miles northeast of Freeport. The test-well configuration consisted of a 24-inch diameter production well (WRP #2, NWF_ID 7176), three six-inch diameter observation wells (MW #1 [7177], MW #2 [7178] and MW #3 [7179]), and a four-inch diameter surficial aquifer observation well. Layne-Central, Inc. constructed the test/production and monitor wells, and performed the 72-hour APT. Layne Geosciences, Inc. analyzed data derived from the test and prepared a report documenting hydraulic properties of the test site. This report describes results of an APT re-analysis conducted by the Northwest Florida Water Management District.

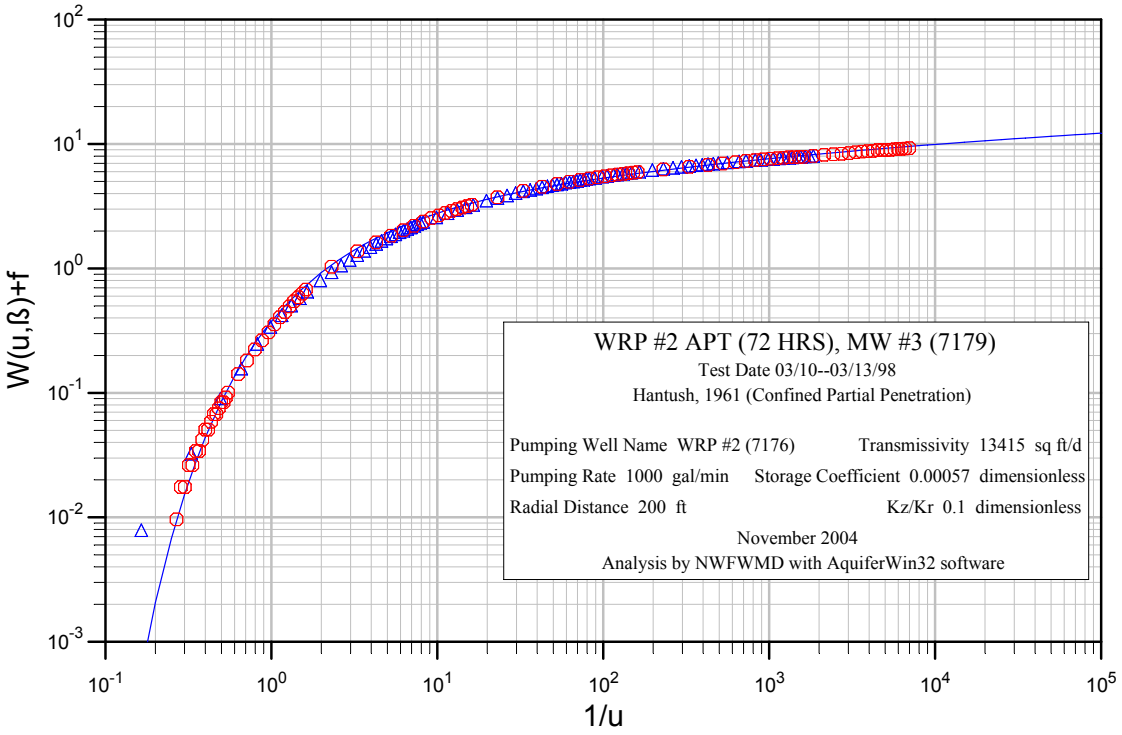
Aquifer testing was performed between March 10 and 13, 1998. The test/production well was pumped at a constant rate of 1,000 gal/min for the test duration. MW #1 was located at a radial distance of 200 ft north from WRP #2. MW #2 was located 400 ft north of WRP #2 and MW #3 was located 200 ft west of WRP #2. Water-level data were collected in all three Floridan Aquifer monitor wells using automated data collection equipment. Unfortunately, data collection in MW #1 and MW #2 did not start until 29 minutes after the test began. Rather than restarting once the error was detected, Layne-Central continued the test and crucial early-time data for these wells were not collected. The data that were collected was deemed not to be suitable for re-analysis by the NWFWMD. 72 hours of drawdown data and 24 hours of recovery data were successfully collected from MW #3.

After 72 hours (4,350 min) of pumping, the test/production well had 20.8 ft of drawdown, yielding a specific capacity of 48.1 gal/min/ft. Based on specific capacity, the transmissivity is estimated as 12,800 ft2/d. MW #1 had an estimated 10.5 ft of drawdown, MW #2 had an estimated 8.58 ft, and MW #3 had 10.62 ft.

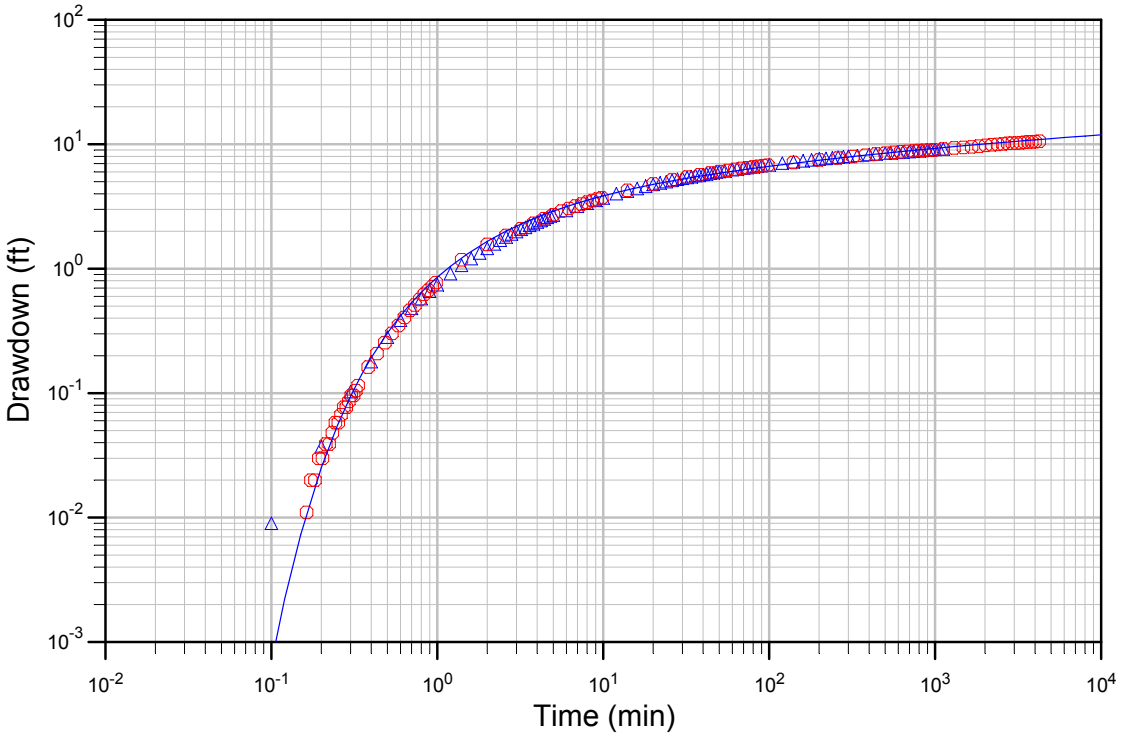
TEST ANALYSIS AND RESULTS

The aquifer test data were analyzed using AquiferWin32 propriety software developed by Environmental Simulations, Inc. Time-drawdown data were preliminarily compared to type curves generated by several analytical models (Theis, Hantush-Jacobs [1955], Hantush [1961], Hantush [1964]). Based on this effort, 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). In order to perform curve-matching analysis, drawdown (circles) and recovery (triangles) data were combined into a single data set and analyzed together. Hydraulic property estimates obtained from MW #3 are respectively, **transmissivity = 13,400 ft2/d**, **storativity = 0.0006 (dimensionless)** and **K_z/K_r = 0.1 (dimensionless)**. The estimated undifferentiated Floridan Aquifer thickness at the site is 550 ft.

Hantush,1961



Predicted Well Response



WRP #2 Owl's Head Floridan Aquifer System
Constant Discharge
Test date: 03/10/98--03/13/1998

Production Well NWF_ID	pumpage rate (gal/min)	radial distance (ft)	Observation Well NWF_ID		
7176	1000	200	**7179**		
elapsed time (min)	**drawdown (ft)**	**elapsed time (min)**	**drawdown (ft)**	**elapsed time (min)**	**drawdown (ft)**
0.163	0.011	6.8	3.189	1840	9.651
0.173	0.02	7.4	3.311	2020	9.811
0.183	0.02	8	3.424	2200	9.924
0.193	0.03	8.6	3.528	2380	9.99
0.203	0.03	9.2	3.622	2560	10.065
0.213	0.039	9.8	3.717	2740	10.197
0.223	0.039	14	4.263	2920	10.225
0.233	0.048	20	4.801	3100	10.215
0.243	0.058	26	5.178	3280	10.272
0.253	0.058	32	5.451	3460	10.375
0.263	0.067	38	5.686	3640	10.46
0.273	0.077	44	5.875	3820	10.46
0.283	0.077	50	6.035	4000	10.498
0.293	0.086	56	6.167	4240	10.592
0.303	0.096	62	6.289		
0.313	0.096	68	6.402		
0.323	0.105	74	6.487		
0.333	0.115	80	6.572		
0.383	0.162	86	6.647		
0.433	0.208	92	6.723		
0.483	0.255	98	6.789		
0.533	0.302	140	7.146		
0.583	0.35	200	7.495		
0.633	0.406	260	7.749		
0.683	0.463	320	7.966		
0.733	0.51	380	8.163		
0.783	0.566	440	8.352		
0.833	0.623	500	8.484		
0.883	0.67	560	8.606		
0.933	0.718	620	8.7		
0.983	0.774	680	8.775		
1.4	1.18	740	8.851		
2	1.567	800	8.926		
2.6	1.849	860	8.954		
3.2	2.095	920	8.982		
3.8	2.321	980	9.03		
4.4	2.519	1120	9.152		
5	2.717	1300	9.359		
5.6	2.906	1480	9.444		
6.2	3.047	1660	9.528		

WRP #2 Owl's Head Floridan Aquifer System
Constant Discharge
Test date: 03/10/98--03/13/1998

Production Well NWF_ID	pumpage rate (gal/min)	radial distance (ft)	Observation Well NWF_ID		
7176	1000	200	**7179**		
elapsed time (min)	**recovery (ft)**	**elapsed time (min)**	**recovery (ft)**	**elapsed time (min)**	**recovery (ft)**
0.1	0.009	22	4.886	640	8.657
0.2	0.037	24	5.009	700	8.742
0.3	0.103	26	5.122	740	8.789
0.4	0.179	28	5.226	800	8.865
0.5	0.282	30	5.32	840	8.912
0.6	0.386	32	5.395	900	8.968
0.7	0.48	34	5.489	940	9.006
0.8	0.574	36	5.593	1000	9.063
0.9	0.658	38	5.621	1060	9.11
1	0.743	40	5.706	1120	9.148
1.2	0.913	42	5.772		
1.4	1.063	44	5.848		
1.6	1.204	46	5.904		
1.8	1.336	48	5.989		
2	1.458	50	6.027		
2.2	1.581	54	6.093		
2.4	1.694	60	6.243		
2.6	1.797	64	6.328		
2.8	1.901	70	6.432		
3	1.986	74	6.498		
3.2	2.07	80	6.592		
3.4	2.146	84	6.639		
3.6	2.23	90	6.724		
3.8	2.296	100	6.837		
4	2.372	120	7.045		
4.2	2.438	140	7.224		
4.4	2.513	160	7.356		
4.6	2.588	180	7.478		
4.8	2.654	200	7.601		
5	2.692	220	7.695		
6	2.937	240	7.789		
7	3.172	260	7.874		
8	3.36	280	7.94		
9	3.539	300	8.006		
10	3.699	340	8.12		
12	4.01	400	8.28		
14	4.199	440	8.355		
16	4.406	500	8.468		
18	4.604	540	8.525		
20	4.755	600	8.61		

NWFWMD Well Inventory Database System
Site Schedule

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site_schedule

Site Id **303452086050501** Site Type **G** NWF ID **7176**

Well Name **SWU #9** State ID **AAA8368**

Owner **SOUTH WALTON UTILITY CO.**

Contact Person **PETE DEBOGORY** Phone

Street **79 OLD HIGHWAY 98**

City **DESTIN** State **FL** Zip County **Walton**

Latitude **303452.79** Longitude **860505.85** Datum **NAD83** Loc Method **Global Positioning Satellite (GPS)**

Land Net **S007T01NR18W** Loc Accuracy **0.3 < 3 meters** Loc Source **NWFWMD**

Elevation **153.83** Datum **NGVD88** Method **Survey**

Accuracy **< 0.1 feet** Source **Owner**

Location Map **ROCK HILL** GW Region **Western Panhandle Embayment Region**

Site Use **Withdrawal** Water Use **Public Supply**

Depth Of Well **512** Depth Of Casing **220**

MP Distance From LSD **1** Diameter **24**

Construction Data Source **Driller** Casing Material **Steel**

Finish **Open Hole** Driller License Number **2459**

Date of Construction **20/01/1998** Construction Method **Air Rotary**

Screen Length

Screened Intervals

Water Level **-117** Measure Date **12/03/1998**

WL Source WL Method

Hydrogeologic Units **Floridan Aquifer (Undiff)**

Lift Power **Electric**

Horsepower Pump Intake

Normal Yield Spcap Discharge **1000**

Spcap Source Spcap Discharge Method

Spcap Static Level **-117** Spcap Pumping Level **-137**

Spcap Drawdown **20** Hours Pumped **72**

Spcap **50**

Field Water Quality Discharge

Temperature pH

Specific Conductance Chloride **1 on 9/23/2004 @ 15:30**

Consumptive Use Permit **19980046** Construction Permit **T199800293**

FL Geological Survey # Abandonment Permit

DEP Public Supply #

Project #'s **87**

Geophysical Log # **83** Depth Logged

Available LOG Data **Caliper** **Gamma** **Electric** **SP**

Visited By **B_ECHOLS** Date Visited **12/03/1998**

Data Entered By **M_MALONEY** Date Entered **22/04/1998**

Last Updated By **T_PRATT** Last Updated **02/02/2004**

Ambient Network **CUPWL**

Land surface elevation equated to surveyed FFE, TRP 02/02/04

edited by TRP, sample date 2/13/1998, sodium < 4 mg/L, TDS = 86 mg/L: Leo Weimern (Feb 99) - This well was production well for WRP multi-well aquifer test. J.T. ARMSTRONG (DRILLER) for Layne Central. (C.Richards, 27 feb 2003; test well converted by cps# T200102929)

site_schedule

NWFWMD Well Inventory Database System
Site Schedule

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Site Id **303454086050601** Site Type **G** NWF ID **7177**

Well Name **SWU #9 MW #1** State ID **AAB1317**

Owner **WRP, INC.**

Contact Person **PETE DEBOGORY** Phone

Street **79 OLD HIGHWAY 98**

City **DESTIN** State **FL** Zip County **Walton**

Latitude **303454.6** Longitude **860506.11** Datum **NAD83** Loc Method **Global Positioning Satellite (GPS)**

Land Net **S007T01NR18W** Loc Accuracy **0.3 < 3 meters** Loc Source **NWFWMD**

Elevation **150** Datum **NGVD88** Method **Topo Map**

Accuracy **>= 5 feet** Source **NWFWMD**

Location Map **ROCK HILL** GW Region **Western Panhandle Embayment Region**

Site Use **Properly Abandoned** Water Use **Monitor**

Depth Of Well **503** Depth Of Casing **220**

MP Distance From LSD **1** Diameter **6**

Construction Data Source **Driller** Casing Material **PVC**

Finish **Open Hole** Driller License Number **2459**

Date of Construction **20/01/1998** Construction Method **Air Rotary**

Screen Length

Screened Intervals

Water Level **-118** Measure Date **20/01/1998**

WL Source **Driller** WL Method

Hydrogeologic Units **Floridan Aquifer (Undiff)**

Lift **No Pump** Power

Horsepower Pump Intake

Normal Yield Spcap Discharge

Spcap Source Spcap Discharge Method

Spcap Static Level Spcap Pumping Level

Spcap Drawdown Hours Pumped

Spcap

Field Water Quality Discharge

Temperature pH

Specific Conductance Chloride

Consumptive Use Permit Construction Permit **T199800294**

FL Geological Survey # Abandonment Permit **T200002592**

DEP Public Supply #

Project #'s **87**

Geophysical Log # **84** Depth Logged **500**

Available LOG Data **Electric** **Gamma** **SP**

Visited By **A_JOINER** Date Visited **20/01/1998**

Data Entered By **M_MALONEY** Date Entered **22/04/1998**

Last Updated By **C_RICHARDS** Last Updated **19/02/2004**

Ambient Network

Leo (Feb99) - This well is being used as an observation well for the WRP, Inc., Aquifer test. A. JOINER (DRILLER). Aquifer test conducted at the site of SWU #9. Consultant report available. Well located 200 ft north of production well.

NWFWMD Well Inventory Database System
Site Schedule

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site_schedule

Site Id	**303456086050601**	Site Type	**G**	NWF ID	**7178**
Well Name	**SWU #9 MW #2**			State ID	**AAB1318**
Owner	**WRP, INC.**				
Contact Person	**PETE DEBOGORY**			Phone	
Street	**79 OLD HIGHWAY 98**				
City	**DESTIN**	State	**FL** Zip	County	**Walton**
Latitude	**303456.57**	Longitude	**860506.57** Datum **NAD83**	Loc Method	**Global Positioning Satellite (GPS)**
Land Net	**S007T01NR18W**	Loc Accuracy	**0.3 < 3 meters**	Loc Source	**NWFWMD**
Elevation	**150**	Datum	**NGVD88**	Method	**Topo Map**
Accuracy	**>= 5 feet**	Source	**NWFWMD**		
Location Map	**ROCK HILL**	GW Region	**Western Panhandle Embayment Region**		

Site Use	**Properly Abandoned**	Water Use	**Monitor**

Depth Of Well	**508**	Depth Of Casing	**220**
MP Distance From LSD	**1**	Diameter	**6**
Construction Data Source	**Driller**	Casing Material	**PVC**
Finish	**Open Hole**	Driller License Number	**2459**
Date of Construction	**01/02/1998**	Construction Method	**Air Rotary**
Screen Length			
Screened Intervals			

Water Level	**-123**	Measure Date	**01/02/1998**
WL Source	**Driller**	WL Method	

Hydrogeologic Units	**Floridan Aquifer (Undiff)**

Lift	**No Pump**	Power	
Horsepower		Pump Intake	
Normal Yield		Spcap Discharge	
Spcap Source		Spcap Discharge Method	
Spcap Static Level		Spcap Pumping Level	
Spcap Drawdown		Hours Pumped	
Spcap			

Field Water Quality		Discharge	
Temperature		pH	
Specific Conductance		Chloride	

Consumptive Use Permit		Construction Permit	**T199800295**
FL Geological Survey #		Abandonment Permit	**T200002593**
DEP Public Supply #			
Project #'s	**87**		
Geophysical Log #	**85**	Depth Logged	**504**
Available LOG Data	**Gamma**		

Visited By	**A_JOINER**	Date Visited	**01/02/1998**
Data Entered By	**M_MALONEY**	Date Entered	**22/04/1998**
Last Updated By	**C_RICHARDS**	Last Updated	**19/02/2004**
Ambient Network			

Leo (Feb99) - This well is being used as an observation well for the WRP, Inc., Aquifer test. A. JOINER (DRILLER), well located 400 ft north of production well.

NWFWMD Well Inventory Database System
Site Schedule

Printed:November 8, 2004 09:09

site_schedule

Site Id	**303452086050701**	Site Type	**G**	NWF ID	**7179**
Well Name	**SWU #9 MW #3**			State ID	**AAB1319**
Owner	**WRP, INC.**				
Contact Person	**PETE DEBOGORY**			Phone	
Street	**75 OLD HIGHWAY 98**				
City	**DESTIN**	State	**FL** Zip	County	**Walton**
Latitude	**303452.23**	Longitude	**860507.97** Datum **NAD83**	Loc Method	**Global Positioning Satellite (GPS)**
Land Net	**S007T01NR18W**	Loc Accuracy	**0.3 < 3 meters**	Loc Source	**NWFWMD**
Elevation	**150**	Datum	**NGVD88**	Method	**Topo Map**
Accuracy	**>= 5 feet**	Source	**NWFWMD**		
Location Map	**ROCK HILL**	GW Region	**Western Panhandle Embayment Region**		

Site Use	**Properly Abandoned**	Water Use	**Monitor**

Depth Of Well	**508**	Depth Of Casing	**220**
MP Distance From LSD	**1**	Diameter	**6**
Construction Data Source	**Driller**	Casing Material	**PVC**
Finish	**Open Hole**	Driller License Number	**2459**
Date of Construction	**01/02/1998**	Construction Method	**Air Rotary**
Screen Length			
Screened Intervals			

Water Level	**-117**	Measure Date	**01/02/1998**
WL Source	**Driller**	WL Method	

Hydrogeologic Units	**Floridan Aquifer (Undiff)**

Lift		Power	
Horsepower		Pump Intake	
Normal Yield		Spcap Discharge	
Spcap Source		Spcap Discharge Method	
Spcap Static Level		Spcap Pumping Level	
Spcap Drawdown		Hours Pumped	
Spcap			

Field Water Quality		Discharge	
Temperature		pH	
Specific Conductance		Chloride	

Consumptive Use Permit		Construction Permit	**T199800296**
FL Geological Survey #		Abandonment Permit	**T200002594**
DEP Public Supply #			
Project #'s	**87**		
Geophysical Log #	**86**	Depth Logged	**499**
Available LOG Data	**Gamma**		

Visited By	**ARMSTRONG**	Date Visited	**01/02/1998**
Data Entered By	**M_MALONEY**	Date Entered	**22/04/1998**
Last Updated By	**C_RICHARDS**	Last Updated	**19/02/2004**
Ambient Network			

Leo (Feb99) - This well is being used as an observation well for the WRP, Inc., Aquifer test. J. C. ARMSTRONG (DRILLER)

NWFWMD Well Inventory Database System
Site Schedule

Printed:November 8, 2004 09:09

site_schedule

Site Id **303453086050501** Site Type **G** NWF ID **7180**

Well Name **SWU #9 SURFICIAL MONITOR** State ID **AAB1320**

Owner **SOUTH WALTON UTILITY CO.**

Contact Person **PETE DEBOGORY** Phone

Street **79 OLD HIGHWAY 98**

City **DESTIN** State **FL** Zip County **Walton**

Latitude **303453.22** Longitude **860505.86** Datum **NAD83** Loc Method **Global Positioning Satellite (GPS)**

Land Net **S007T01NR18W** Loc Accuracy **0.3 < 3 meters** Loc Source **NWFWMD**

Elevation **154.12** Datum **NGVD29** Method **Survey**

Accuracy **< 0.1 feet** Source **Owner**

Location Map **ROCK HILL** GW Region **Western Panhandle Embayment Region**

Site Use **Monitor / OBS** Water Use **Monitor**

Depth Of Well **60** Depth Of Casing **45**

MP Distance From LSD **3.01** Diameter **4**

Construction Data Source **Driller** Casing Material **PVC**

Finish **Screen** Driller License Number **2459**

Date of Construction **03/02/1998** Construction Method **Air Rotary**

Screen Length **15**

Screened Intervals **45 / 60**

Water Level **-13** Measure Date **03/02/1998**

WL Source **Driller** WL Method

Hydrogeologic Units **Sand & Gravel**

Lift **No Pump** Power

Horsepower Pump Intake

Normal Yield Spcap Discharge

Spcap Source Spcap Discharge Method

Spcap Static Level Spcap Pumping Level

Spcap Drawdown Hours Pumped

Spcap

Field Water Quality Discharge

Temperature pH

Specific Conductance Chloride

Consumptive Use Permit Construction Permit **T199800297**

FL Geological Survey # Abandonment Permit

DEP Public Supply #

Project #'s **87**

Geophysical Log # **87** Depth Logged **56**

Available LOG Data **Gamma**

Visited By **L_MOONEY** Date Visited **03/02/1998**

Data Entered By **M_MALONEY** Date Entered **22/04/1998**

Last Updated By **T_PRATT** Last Updated **02/02/2004**

Ambient Network **CUWLM**

Leo (Feb99) - This well is being used as an observation well for the WRP, Inc., aquifer test. J.C. ARMSTRONG (DRILLER) Located at SWU Well # 9