THE COLINAS GROUP, INC.
ENGINEERING AND ENVIRONMENTAL CONSULTANTS

HYRAULIC TESTING AND EVALUATION
REEDY CREEK IMPROVEMENT DISTRICT
WELLS NO.13 AND NO.14

Prepared For:

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MAITLAND, FLORIDA

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SEPTEMBER 2000

HYDRAULIC TESTING AND EVALUATION
REEDY CREEK IMPROVEMENT DISTRICT
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TABLE OF CONTENTS

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1.0 INTRODUCTION

1.1 Purpose and Scope

As part of proposed improvements to the existing Reedy Creek Improvement District (RCID) reclaimed wastewater reuse system, the RCID is planning to incorporate two existing water wells into the system for the express purpose of maintaining pressure throughout the network. Under severe demand conditions, the reclaimed water system is subject to low pressure events.

This investigation was completed to test the hydraulic characteristics of the two RCID wells and determine maximum practical withdrawal rates at each well. This determination is based on emperical data collected during step-drawdown tests at each well and evaluation of well and aquifer hydraulic response to test withdrawals. Maximum practical pumping rates for the wells are presented considering well and aquifer hydraulic characteristics and assuming use of conventional vertical line-shaft turbine pumping gear. The evaluation does not consider regulatory agency rules and regulations regarding safe yield, impacts on adjacent legal users and environmental impacts associated with drawdowns resulting from future well use.

1.2 Project Location

Existing RCID wells no.13 and no.14 are located near the Magic Kingdom portion of Walt Disney World. Well No.13 is situated about 1/4 mile west of the Magic Kingdom main entrance ticket plaza and just south of Disney's automobile race track. RCID Well No.14 is located about 1/2 mile south of No.13, adjacent to the RCID Environmental Laboratory and reclaimed water treatment facility.

1.3 Well Descriptions

According to RCID records, both existing wells were installed in 1970 during early construction of Walt Disney World and have not been used in recent years. Both wells were fitted with vertical turbine pumps at the time of this investigation, although Well No.14, near the reclaimed water plant, was absent the pump motor. Well No.13 was fitted with an electric pump motor and

emergency diesel prime mover. Both wells were equipped with 60 feet of pump column above the bowl assemblies. Existing pumping gear was removed from each well for this investigation to allow use of temporary pumps and prime mover capable of pumping the wells through a range of withdrawal rates.
The construction configuration of the wells are given below, taken from RCID records and results of geophysical logs completed as part of this investigation.

TABLE 1
CONFIGURATION OF EXISTING WELLS 13 AND 14

Well No.	RCID Total Depth (ft.bls)	Logged Total Depth (ft.bls)	Casing Depth (ft.bls)	Casing Diameter (in)	Openhole Diameter (in)
13	400	377	188	24	24
14	403	340	170	16	12

notes: 1. bls means below land surface
2. Casing/borehole diameter and depth from geophysical logs

2.0 DATA COLLECTION

2.1 Downhole Geophysical Well Logging

Both wells were logged using conventional downhole geophysical logging methods following removal of the existing pump gear. Logging was provided by Southern Resource Exploration, Gainesville, Florida. Logging surveys included:

- Caliper
- Spontaneous Potential
- Natural Gamma Ray
- Formation Electrical Resistivity (Long and Short Normal)
- Fluid Specific Conductance
- Fluid Temperature

Copies of the logs for each well are included in the Appendix to this report.

2.2 Step-Drawdown Test

A temporary test pump equipped with a variable-speed diesel engine was installed in each well to complete step-drawdown tests. The test pump consisted of a single-stage 14-inch diameter bowl assembly attached to 60 feet of 8-inch diameter pump column. A 10-foot tailpipe was fitted below the bowl assembly to minimize turbulent flow into the pump intake.

Discharge from the test pump was measured using a calibrated accumulating in-line flow meter installed a minimum of 10 pipe diameters (10 in.) from the pumphead. Discharge was routed away from the wells with 10-inch diameter irrigation pipe. Discharge at RCID Well No.13 was routed to wetlands south of the well for eventual discharge into one of the RCID drainage canals. Discharge at Well No.14 was routed to a parking lot east of the Environmental Laboratory building and eventual discharge into adjacent wetlands.

Drawdown measurements were taken at each well beneath the temporary pump base at the top of well casing. Static water level and drawdown measurements were made manually using an electric water level sensor (m-scope) calibrated in feet.

2.2.1 RCID Well No.13

The step-drawdown test for Well No.13 was conducted on August 27, 2000 with continuous pumping for a total of 360 minutes. No rainfall occurred at or near the well site during the test period. The initial withdrawal rate was established by starting the diesel engine with the throttle set at near idle. Discharge-drawdown measurements were collected until the dynamic water level in the well appeared to reach quasi-steadystate conditions. The pumping rate was then arbitrarily elevated by increasing the engine rpm's by approximately 1/3 of maximum operating rpm. This method was used to pump the well at four distinct pumping rates, up to the maximum capacity of the installed test equipment.

Time/discharge/drawdown data collected during the step-drawdown test at Well No.13 are presented on Figure 1. As shown, the well was pumped at four discrete steps of 670, 1,200, 2,070 and 3,040 gallons per minute (gpm) to complete the step-drawdown test.

Test pumping equipment for the tests was provided and operated by Meredith Environmental Services, Inc., Orlando, Florida. Time-discharge-drawdown measurements were recorded by a representative of The Colinas Group, Inc.

2.2.2 RCID Well No.14

The step-drawdown test for this well was complete on September 8, 2000. No rainfall occurred at or near the well site during the test. This test was run for a total of 360 minutes using the increasing rate method described above for Well No.13. Time/discharge/drawdown data from the test are presented on Figure 2.

Evidence of well development was noted at Well No.14 when the pumping rate was increased from the second to third pumping step. Discharge from the well was observed to contain relatively large quantities of sediment, consisting of fine to coarse-grained quartz sand, clay, limestone and dolostone particles and small fragments of neat cement. After about 15 minutes of pumping at the third step (2,240 gpm) the discharge cleared considerably and remained clear during the remainder of the pumping step. The discharge again became turbid when the pumping rate was increased for the fourth step. Turbid conditions were apparent for about 30 minutes into the fourth pumping step. Sediment consisted of quartz sand, clay, limestone/dolostone and cement fragments.

The effects of apparent well development during the step-drawdown test are evident in the time/discharge/drawdown data plot shown on Figure 2. Increased drawdown during the early portions of pumping steps three and four are attributed to initial resistance to flow into the borehole at the higher rates and the increased density of the fluid-sediment stream.

Examination of the geophysical logs for Well No.14 suggests that the lower portion of the open-hole section of the well is infilled with sediment. The logger could not advance tools below a depth of 377 ft.bls. RCID well construction records indicate a total depth for the well of 403 ft.bls.

3.0 TEST PROGRAM RESULTS

3.1 Well Characteristics

Except for total well depths, the caliper log results confirm the well dimensions reported by the RCID for the subject wells. Both wells are cased into the top of the limestones forming the upper part of the Floridan aquifer system. Slight increases in gamma radiation near the casing seats suggest the wells are cased into the top of the Ocala Group immediately below the phosphate-bearing Hawthorn Group sediments.

The caliper logs provide evidence of fracture/cavity features in the limestones generally at depths below 300 feet. The electric logs correlate with the caliper logs and indicate primary production zones at about 320 to 370 ft.bls in Well No.13 and between about 310 to 330 ft.bls in Well No.14. The electric logs suggest that Well No.13 is the more productive of the two wells in terms of specific capacity and available yield. A slight change in fluid temperature and specific conductance at depths of about 320 to 330 ft.bls may be indicative of a major groundwater producing zone in this depth interval.

3.2 Apparent Specific Capacity

Specific capacity measured from the step-drawdown test data reflect an apparent specific capacity that includes the effects of well losses from entrance of water into the borehole and vertical flow up the well to the pump intake and through the pump column. Resistance to flow imparted by the rugged borehole walls and friction losses in the well casings and pump columns results in greater drawdown in the wells as compared to drawdown within the formations surrounding the wells.

Because head losses in the wells and the adjacent formations are inversely proportional to discharge rate, the apparent specific capacity of the wells should decrease with increases in pumping rates. Apparent specific capacity for the wells at the range of pumping rates used for the step-drawdown tests are tabulated below from the test records.

TABLE 2
APPARENT SPECIFIC CAPACITY
CALCULATED FROM STEP-DRAWDOWN TEST DATA

Well No.	Pumping Rate (gpm)	Specific Capacity (gpm/ft)	Well No.	Pumping Rate (gpm)	Specific Capacity (gpm/ft)
13	670	1,811	14	1,100	431
	1,200	1,277		1,620	290
	2,070	967		2,240	224
	3,040	768		2,880	172

Calculated apparent specific capacity for both wells at the range of pumping rates used during the step-drawdown tests are presented graphically on Figure 3.

3.3 Pumping Water Levels

Apparent specific capacity calculated from the step-drawdown test data may be used to extrapolate dynamic water levels experienced during pumping of wells finished in the Floridan aquifer system. Dynamic water levels in the wells, projected through the range of pumping rates used during the test period, are presented graphically on Figures 4 and 5.

Projected water levels shown are referenced to the top of casing at each well and reflect hydrologic conditions existing prior to the test period. The tests were preceded by a rather extended and atypical dry period of about 6 months duration marked by a significant deficit in rainfall, and hence, aquifer recharge. The water levels measured during the test period are considered below annual normal levels. Water levels in the wells will rise with the return of more normal hydrologic conditions.

The graphs of projected dynamic water levels are useful for design of pump intake settings and estimation of total dynamic head for use in pump and piping design. Use of these levels will likely impart a degree of conservatism to pump design calculations.

3.4 Corrected Specific Capacity

Specific capacity test data may be used to estimate local aquifer hydraulic charactristics immediately around the wells by correcting for well losses. Well loses include the effects of turbulent flow at the borehole/formation interface and flow in the well to the pump intake. In wells finished as open-hole in the fractured and cavernous limestones of the Floridan aquifer, well losses are generally nominal at lower pumping rates. At large pumping rates well losses can be a significant fraction of the total observed drawdown used to calculate specific capacity.

3.4.1 Formation and Well Losses

Total drawdown measured in a well during pumping is comprised of drawdown due to head loss associated with flow into and within the well and drawdown resulting from friction losses due to flow within the aquifer, or formation, surrounding the well. Subtracting well loss from total drawdown for successive pumping rates will yield drawdown due to formation losses, which can in turn be used to reasonably estimate local aquifer transmissivity from pumping test data.

Formation and well losses are estimated for Wells 13 and 14 using a graphical method presented by Todd(1980). In Figure 6 time/discharge/drawdown data from the step-drawdown test at Well No.13 are plotted as the inverse of apparent specific capacity and respective discharge rate. A best-fit line is drawn through the data plot to determine formation loss coefficient (B) and well loss coefficient (C). The graphical plot for Well No.14 test data is presented on Figure 7.

Estimated formation and well loss components of the total drawdown measured during the step-drawdown tests are presented graphically on Figure 8. The hydraulic differences between the two wells at similar pumping rates are apparent from the graph data. At large pumping rates, well losses are a significant portion of total drawdown in both wells and more significant at Well No.14, constructed with a smaller diameter casing and openhole section. Formation loss is also larger at Well No.14, and assuming similar storage and leakance coefficients, suggesting a lower local aquifer transmissivity in the vicinity of this well as compared to Well No.13.

3.4.2 Estimated Aquifer Transmissivity

The apparent specific capacity calculated for the range of pumping rates used during the step-drawdown test at each well can be corrected to account only for formation losses by subtracting the well loss component of total observed drawdown. These specific capacity values can then be used to estimate transmissivity using a method developed for Floridan aquifer wells by Shaw (1984).

Estimated formation and well losses for both wells and corrected specific capacity values are presented together with estimated aquifer transmissivity derived from the corrected values in Table 3 below. The transmissivity estimates vary through a small range for the range of apparent specific capacity values, suggesting reasonable estimates of well loss determined from the step-drawdown test data.

TABLE 3
SUMMARY OF STEP-DRAWDOWN TEST RESULTS
AND WELL LOSS CORRECTIONS

Well No.	Discharge Rate (gpm)	Total Drawdown (ft)	Well Loss (ft)	Form. Loss (ft)	App. Specific Capacity (gpm/ft)	Corr. Specific Capacity (gpm/ft)	Estimated Transmissivity (gpd/ft)
13	670	0.37	0.12	0.25	1,811	2,680	5.36xE6
	1,200	0.94	0.54	0.40	1,277	3,000	6.00xE6
	2,070	2.14	1.44	0.70	967	2.957	5.91xE6
	3,040	3.96	2.86	1.10	768	2,764	5.53xE6
					Average	**2,850**	**5.70xE6**
14	1,100	2.55	0.75	1.80	431	611	1.22xE6
	1,620	5.59	2.89	2.70	290	600	1.20xE6
	2,240	10.02	6.32	3.70	224	605	1.21xE6
	2880	16.72	11.82	4.90	172	588	1.18xE6
					Average	**601**	**1.20xE6**

4.0 CONCLUSIONS

Results of the step-drawdown tests at RCID Wells No.13 and 14 indicate that the upper part of the Floridan aquifer is highly transmissive and capable of supplying a large, sustained yield of groundwater to wells. From the data collected during this investigation, we offer the following conclusions regarding proposed use of Wells 13 and 14:

1. Transmissivity of the upper part of the Floridan aquifer is large at Well No.14, estimated at 1,200,000 gpd/ft, and much larger at Well No.13 (T=5,700,000 gpd/ft). This characteristic is the primary reason that wells yielding thousands of gallons per minute are common within the western portion of the RCID.

2. Well No.13 is capable of a sustainable pumping rate approaching 5,000 gpm with reasonable drawdown and hence, well efficiency. Considering a maximum allowable drawdown of 20 feet, the maximum capacity of Well No.14 is estimated at about 3,300 gpm. Conventional vertical line-shaft turbine pumps, designed specifically for the casing dimensions of the wells, are available to deliver yields of this magnitude. The RCID may want to consider the costs associated with operating pumping systems at these rates and heads prior to selection of actual design pumping rates.

3. Formation losses associated with withdrawals from the RCID wells are relatively small due to the extremely large aquifer transmissivity. This condition results in small drawdowns away from the well and a significantly reduced potential for adversely affecting water levels in nearby wells and overlying aquifers.

4. The caliper logs for each well indicate that the well casings in both wells are in reasonably good condition and serviceable. Evidence of excessive corrosion, calcitic deposits or perforations of the casings were not observed during this investigation.

REFERENCES

Shaw, J. E., and Trost, S. M., 1984, Hydrogeology of the Kissimmee River Planning Area, South Florida Water Management District: South Florida Water Management District, Resource Planning Department, Groundwater Division, Technical Publication 84-1, W. Palm Beach, Florida.

Todd, D. K., 1980, Groundwater Hydrology: University of California, Berkeley and David Keith Todd Engineers, Inc., John Wiley & Sons, New York, N.Y.

Walton, W. C., 1970, Groundwater Resource Evaluation: McGraw-Hill Series in Water Resources and Environmental Engineering, McGraw-Hill Book Co., New York, N.Y.

APPENDIX

A. Figures 1 through 8
B. Step-Drawdown Test Records
C. Geophysical Well Logs (In Pocket)

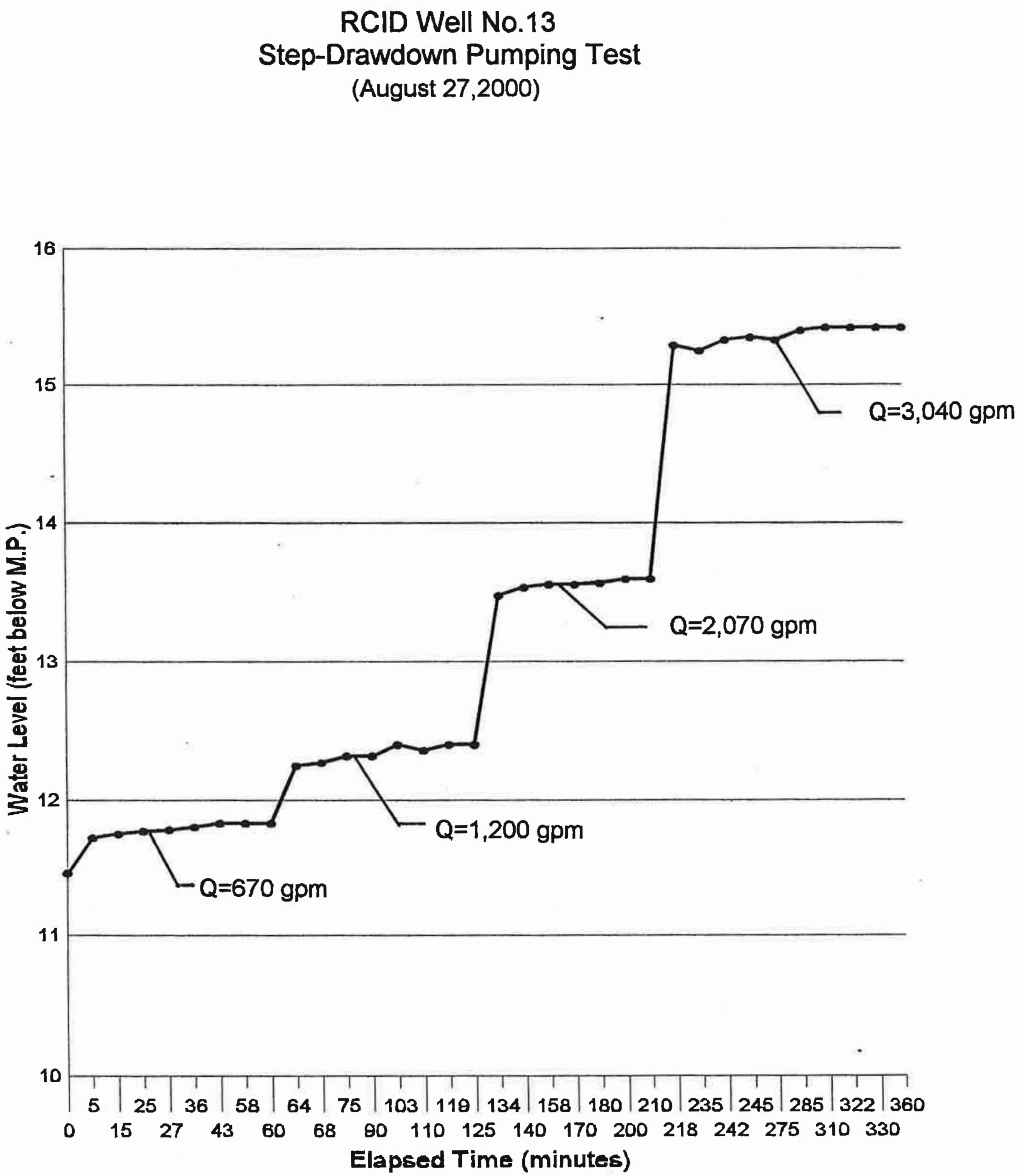


Figure 1. Time/drawdown data from step-drawdown test at RCID Well No.13

RCID Well No.14
Step-Drawdown Pumping Test
(September 8, 2000)

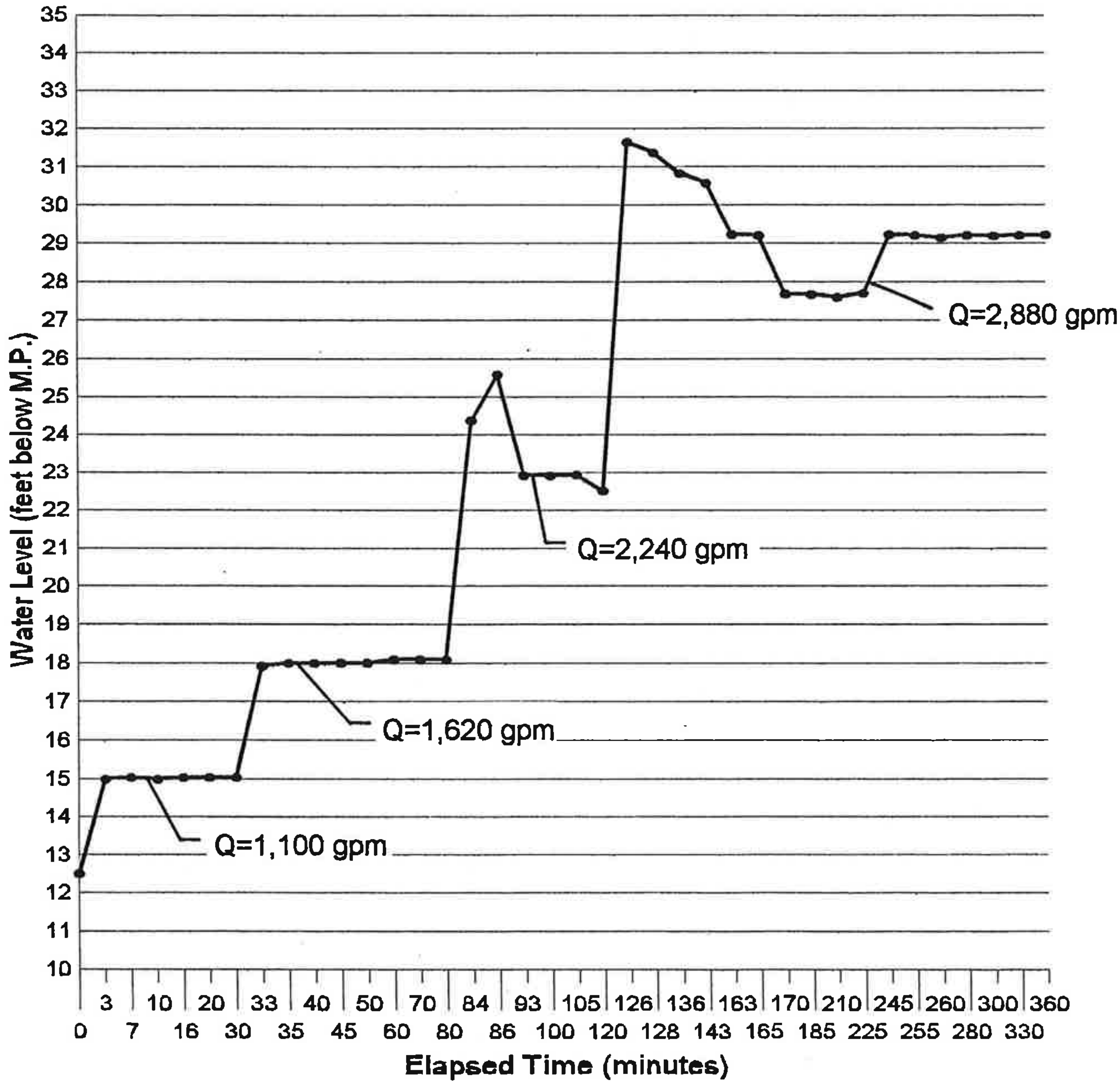
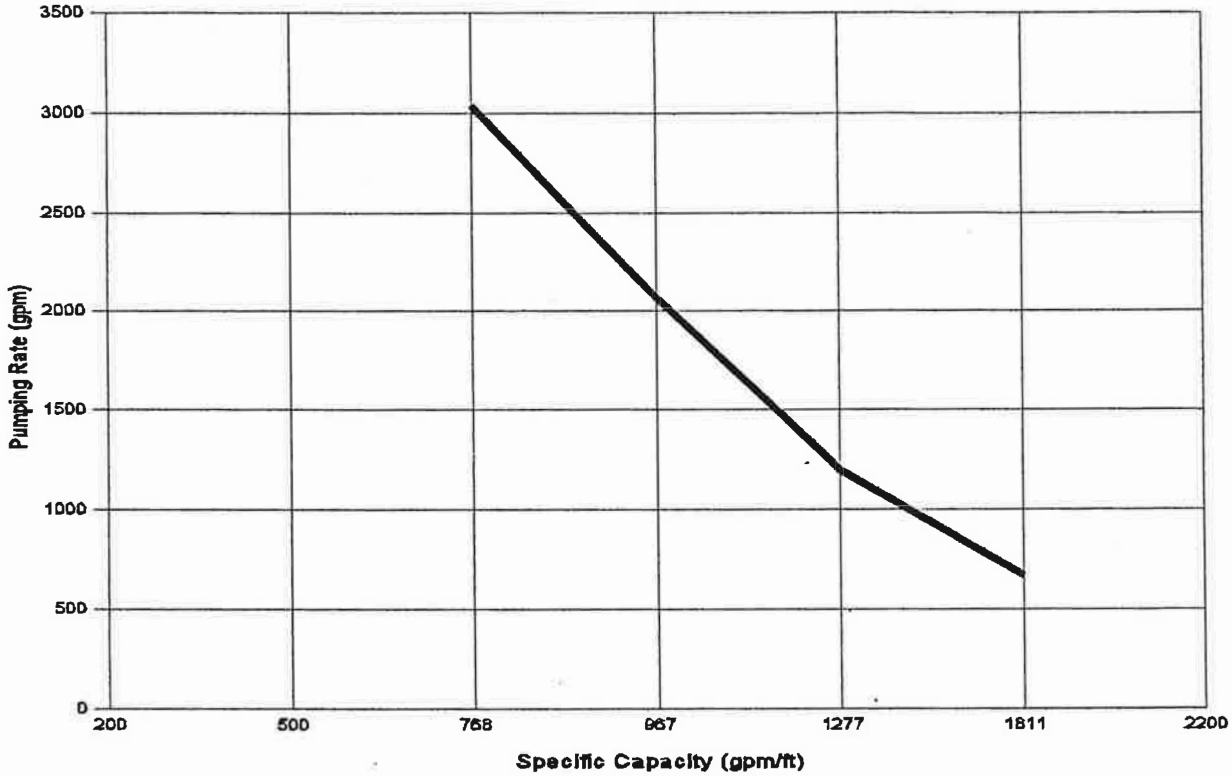


Figure 2. Time/drawdown data from step-drawdown test at RCID Well No.14.

RCID Well No.13
Specific Capacity vs. Pumping Rate



RCID Well No.14
Specific Capacity vs. Pumping Rate

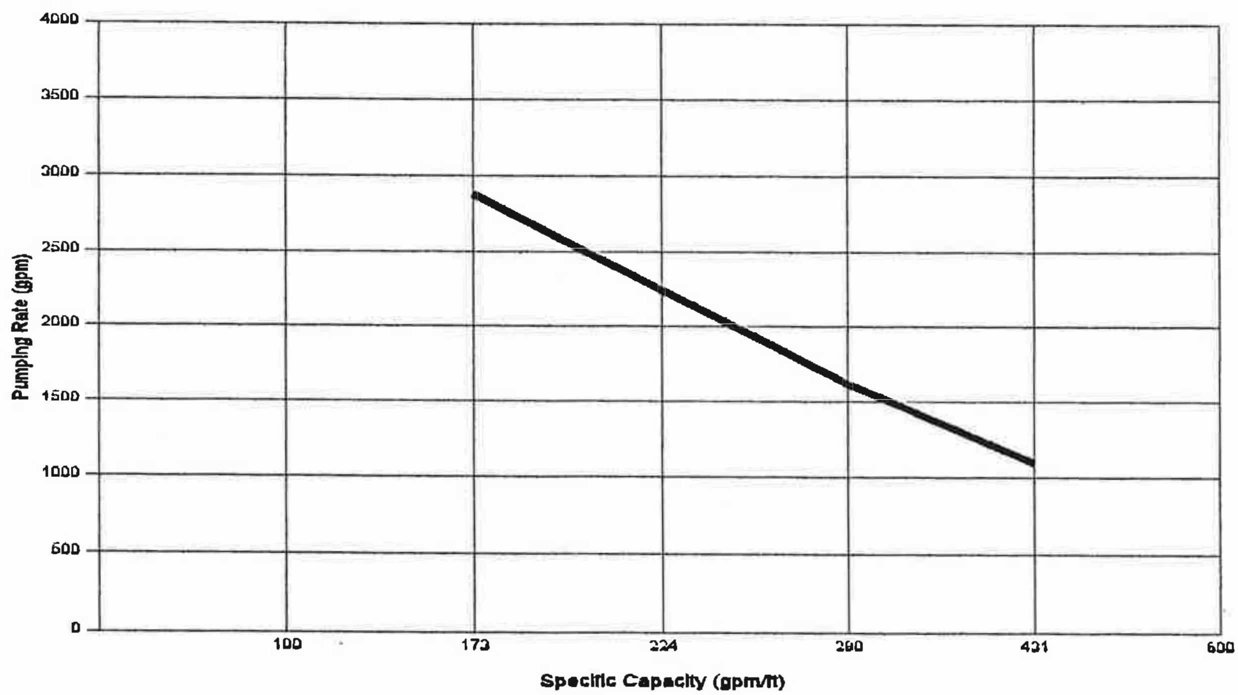


Figure 3. Specific capacity through a range of discharge rates at RCID wells no.13 and 14.

RCID Well No.13
Pumping Rate vs. Borehole Water Level

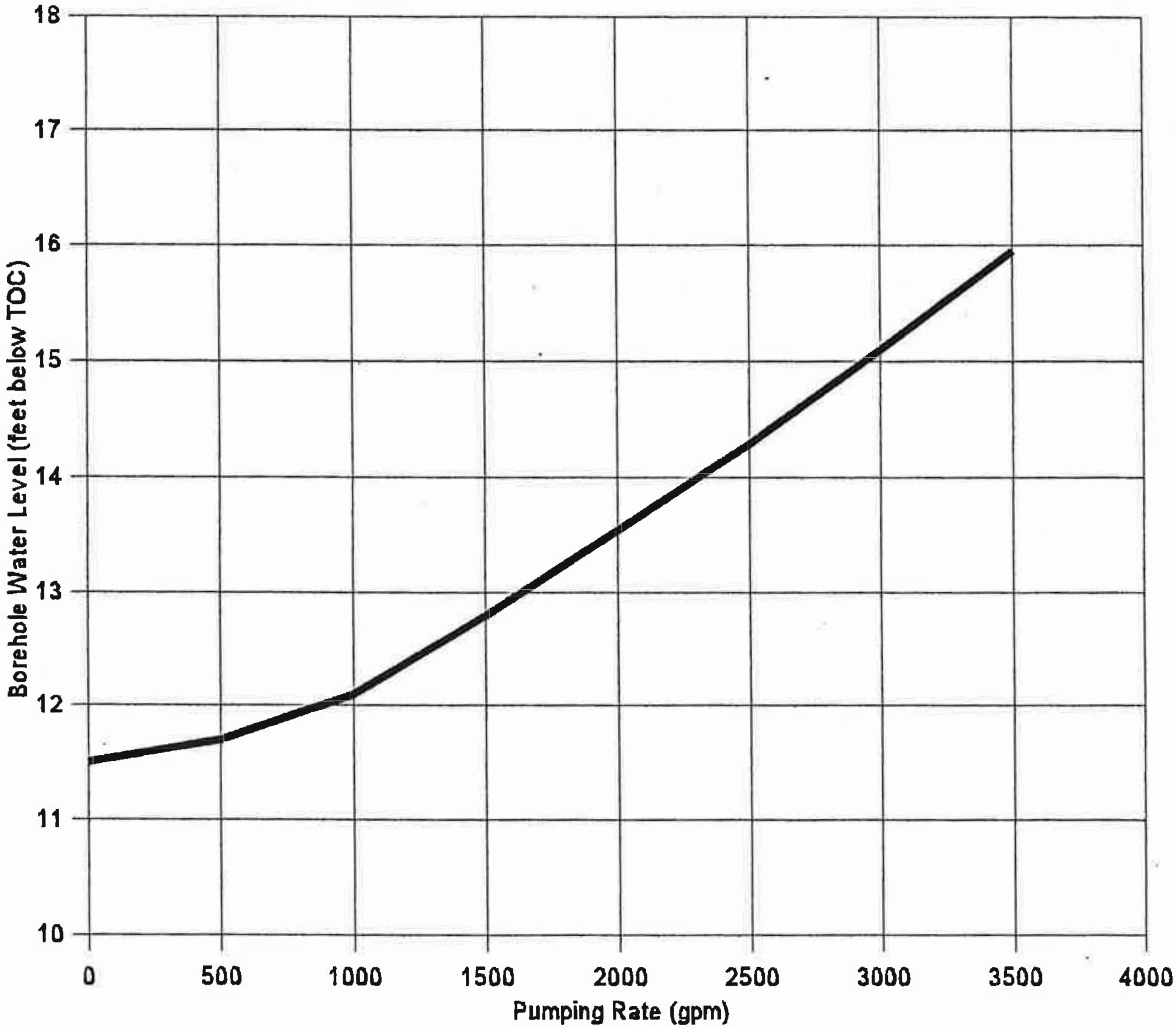


Figure 4. Dynamic water level in RCID Well No.13 through a range of discharge rates.

RCID Well No.14
Pumping Rate vs. Borehole Water Level

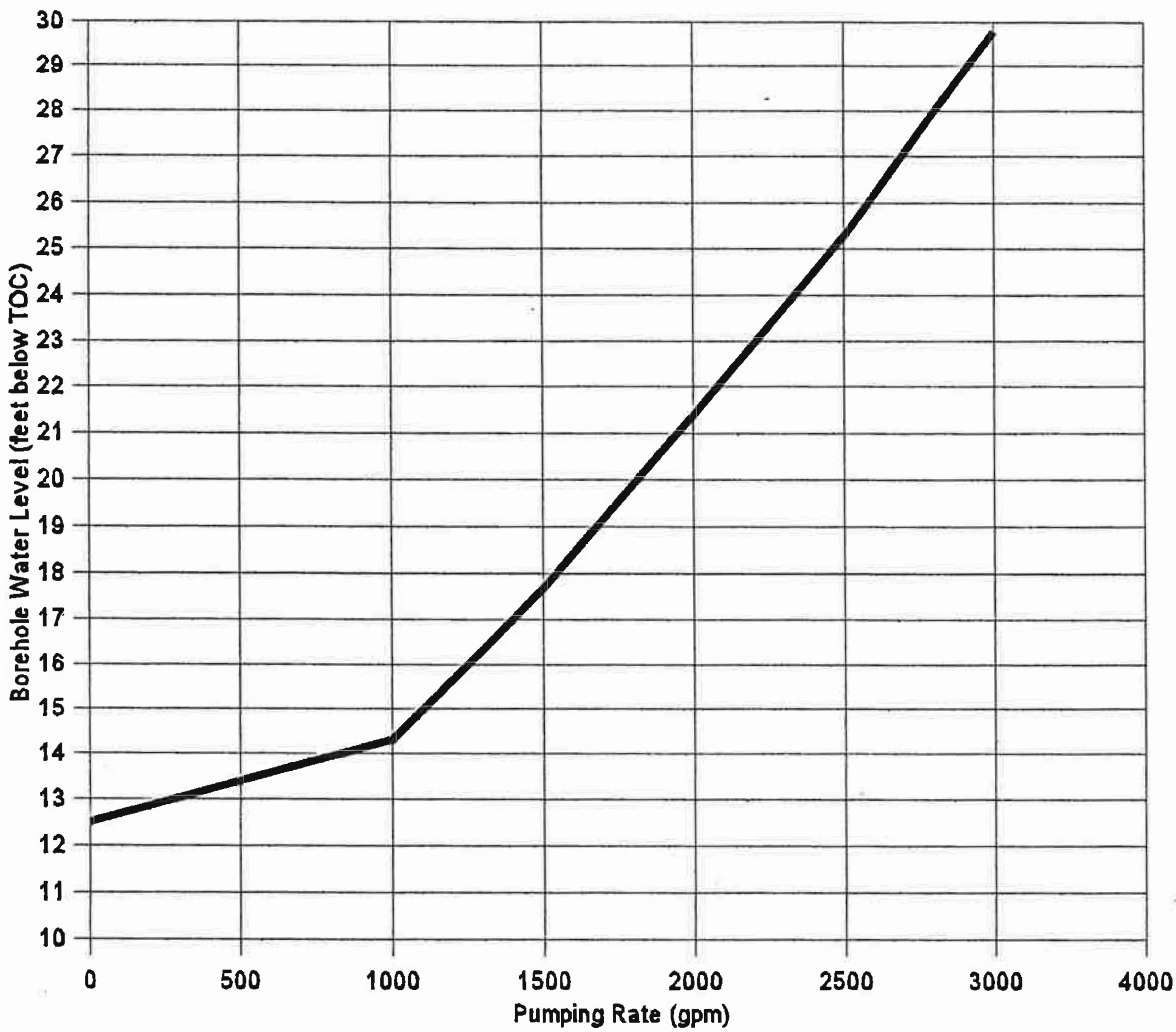
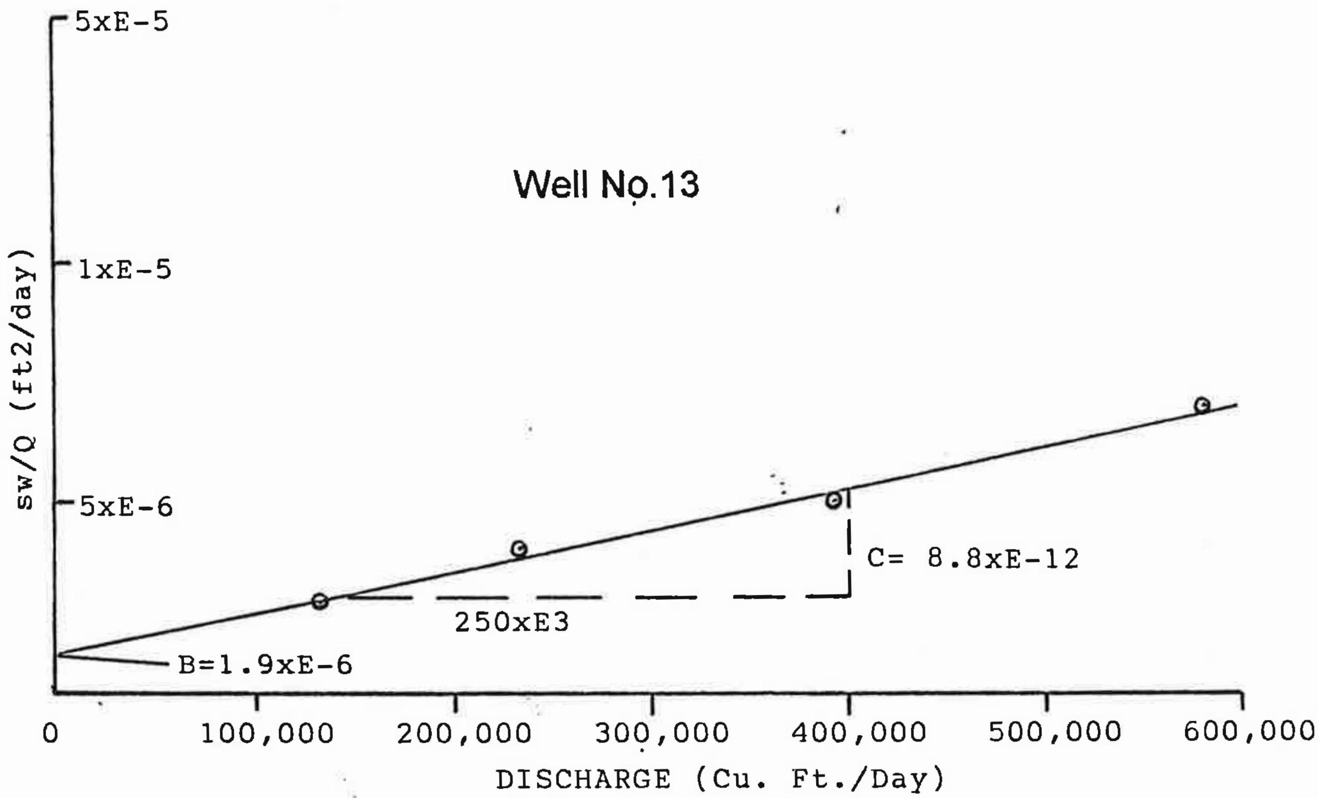
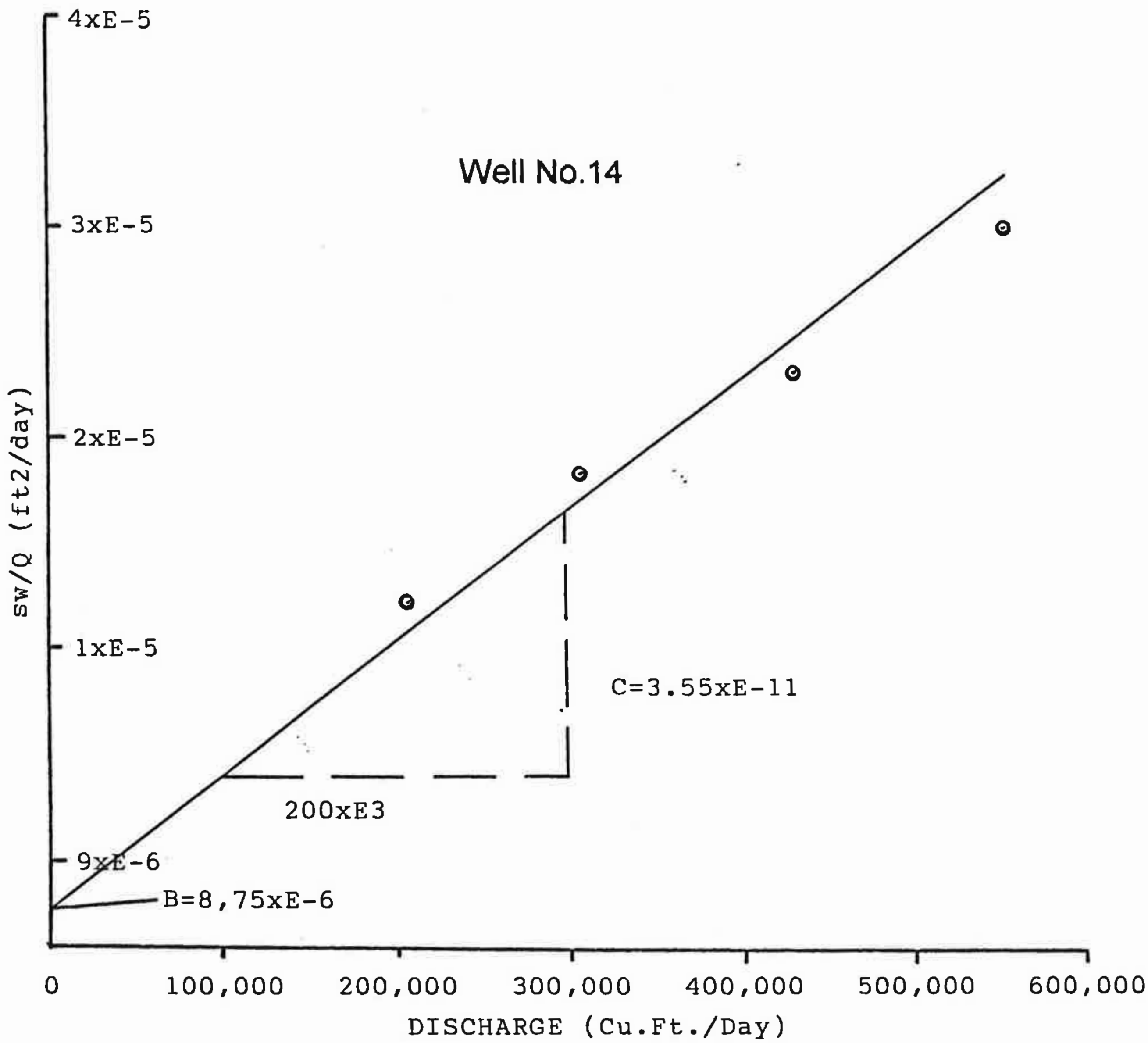


Figure 5. Dynamic water level in RCID Well No.14 through a range of discharge rates.



Step	Discharge (gpm)	Discharge (ft3/day)	Total s (ft)	sw/Q (ft2/day)
1	670	128,984	0.37	2.9xE-6
2	1200	231,016	0.94	4.1xE-6
3	2070	398,503	2.14	5.4xE-6
4	3040	585,241	3.96	6.8xE-6

Figure 6. Graph of sw/Q versus discharge (Q) for RCID Well No.13.



Step	Discharge (gpm)	Discharge (ft3/day)	Total s (ft)	sw/Q (ft2/day)
1	1100	211,765	2.55	1.2xE-5
2	1620	311,872	5.59	1.8xE-5
3	2240	431,230	10.02	2.3xE-5
4	2880	554,438	16.72	3.0xE-5

Figure 7. Graph of sw/Q versus discharge (Q) for RCID Well No.14.

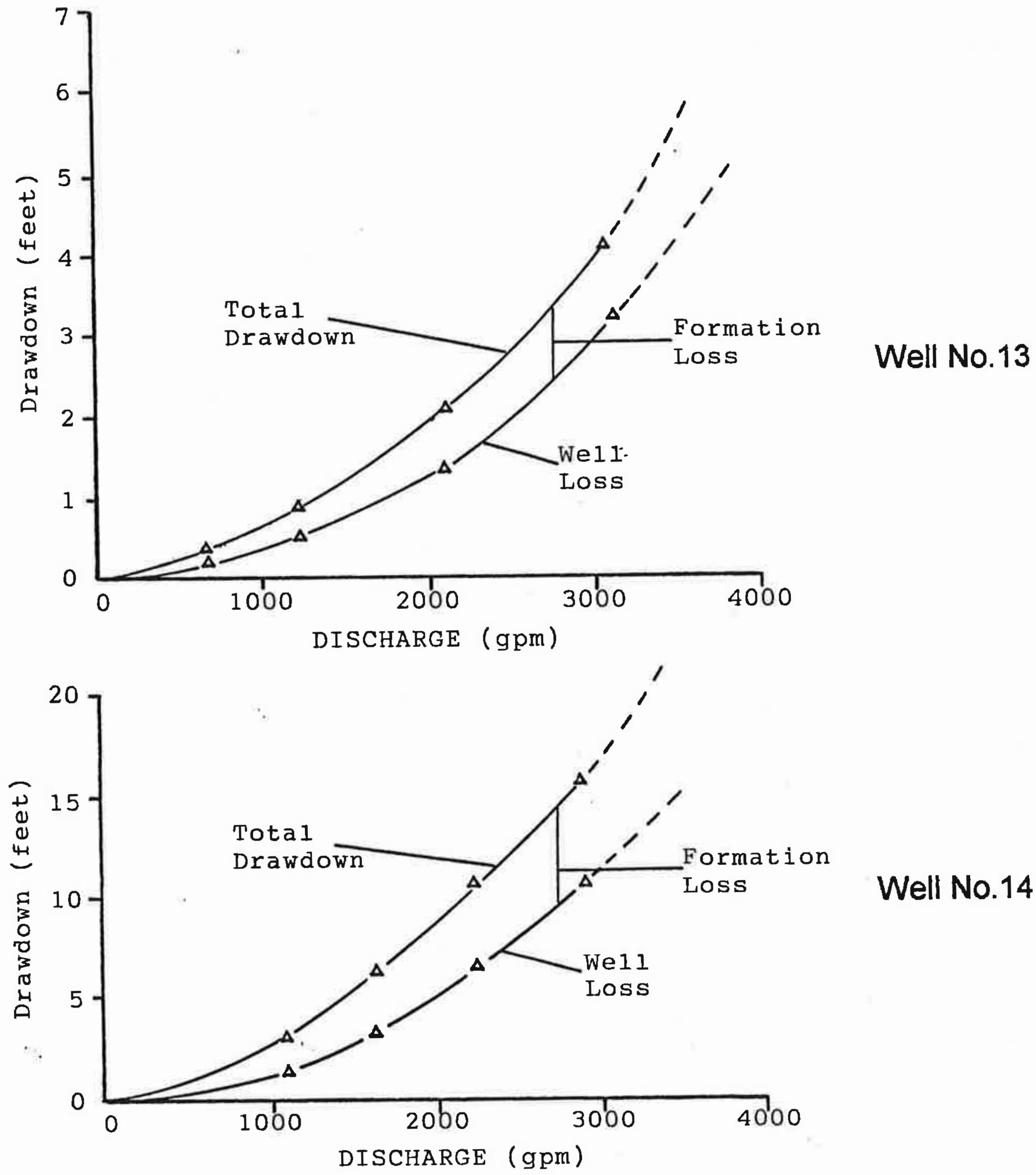


Figure 8. Graph of total drawdown (sw), formation loss and well loss for RCID wells No.13 and 14.

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FIELD DATA FORM: STEP-DRAWDOWN TEST

Project Name: RCID Well Testing
Date: 8 SEPT 2000
TCG Project No. 00-0-159 Sheet No. 1 of 2
Well No. 14

TCG Representative: R.L.Potts
Well Dia. 16" M.P. Toc
Remarks:
Water Level (static) 12.5 ft.-toc

Elapsed Time (min)	Depth to water (feet)	Pump Discharge (gpm)	Elapsed Time (min)	Depth to Water (feet)	Pump Discharge (gpm)
0	12.50	0	82	24.13	2,300
3	15.00	1,100	84	24.38	2,300
7	15.05		86	25.60	2,300
10	15.00	1,100	93	22.92	---
16	15.05	1,100	97	22.98	2,200
20	15.05	1,100	100	22.92	2,250
30	15.05	1,100	103	22.94	---
31	---	1,640	105	22.94	2,240
33	17.92	1,640	120	22.52	2,240
35	17.99	1,625	123	---	3,000
40	17.99	1,620	126	31.65	3,100
45	18.00	1,620	128	31.38	---
50	18.00	---	136	30.83	3,000
60	18.09	1,620	143	30.58	3,000
70	18.09	1,620	148	30.58	3,020
80	18.09	1,620	163	29.23	2,800
81	---	2,300	165	29.20	2,790

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FIELD DATA FORM: STEP-DRAWDOWN TEST

Project Name: RCID Well Testing Date: 8 SEPT 2000
TCG Project No. 00-0-159 Sheet No. 2 of 2 Well No. 14

TCG Representative: R.L.Potts Well Dia. 16" M.P. Toc
Remarks: Well is developing during higher pump rates Water Level
(static) 12.5 ft.-toc

Elapsed Time (min)	Depth to water (feet)	Pump Discharge (gpm)	Elapsed Time (min)	Depth to Water (feet)	Pump Discharge (gpm)
170	27.69	2,810			
185	27.68	2,800			
210	27.60	2,800			
225	27.71	2,800			
245	29.23	2,900			
255	29.21	2,900			
260	29.15	2,900			
280	29.21	2,880			
300	29.19	2,880			
330	29.21	2,880			
360	29.22	2,880			

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FIELD DATA FORM: STEP-DRAWDOWN TEST

Project Name: RCID Well Testing
TCG Project No. 00-0-159 Sheet No. 1 of 1
TCG Representative: R. L. Potts
Remarks:

Date: 27 AUG 2000
Well No. 13
Well Dia. 24" M.P. toc
Water Level (static) 11.46 ft-toc

Elapsed Time (min)	Depth to water (feet)	Pump Discharge (gpm)	Elapsed Time (min)	Depth to Water (feet)	Pump Discharge (gpm)
0	11.46	0	134	13.48	2100
5	11.72	670	140	13.54	2080
15	11.75		158	13.56	2070
25	11.77	670	170	13.56	2070
27	11.78		180	13.57	2070
36	11.80	670	200	13.60	2070
43	11.83		210	13.60	2070
58	11.83	670	218	15.29	3050
60	11.83	670	235	15.25	3050
64	12.25	1200	242	15.33	3040
68	12.27	1200	245	15.35	3040
75	12.32	1200	275	15.33	3040
90	12.32		285	15.40	
103	12.40	1200	310	15.42	3040
110	12.36		322	15.42	3040
119	12.40	1200	330	15.42	3040
125	12.40		360	15.42	3040

Southern Resource Exploration

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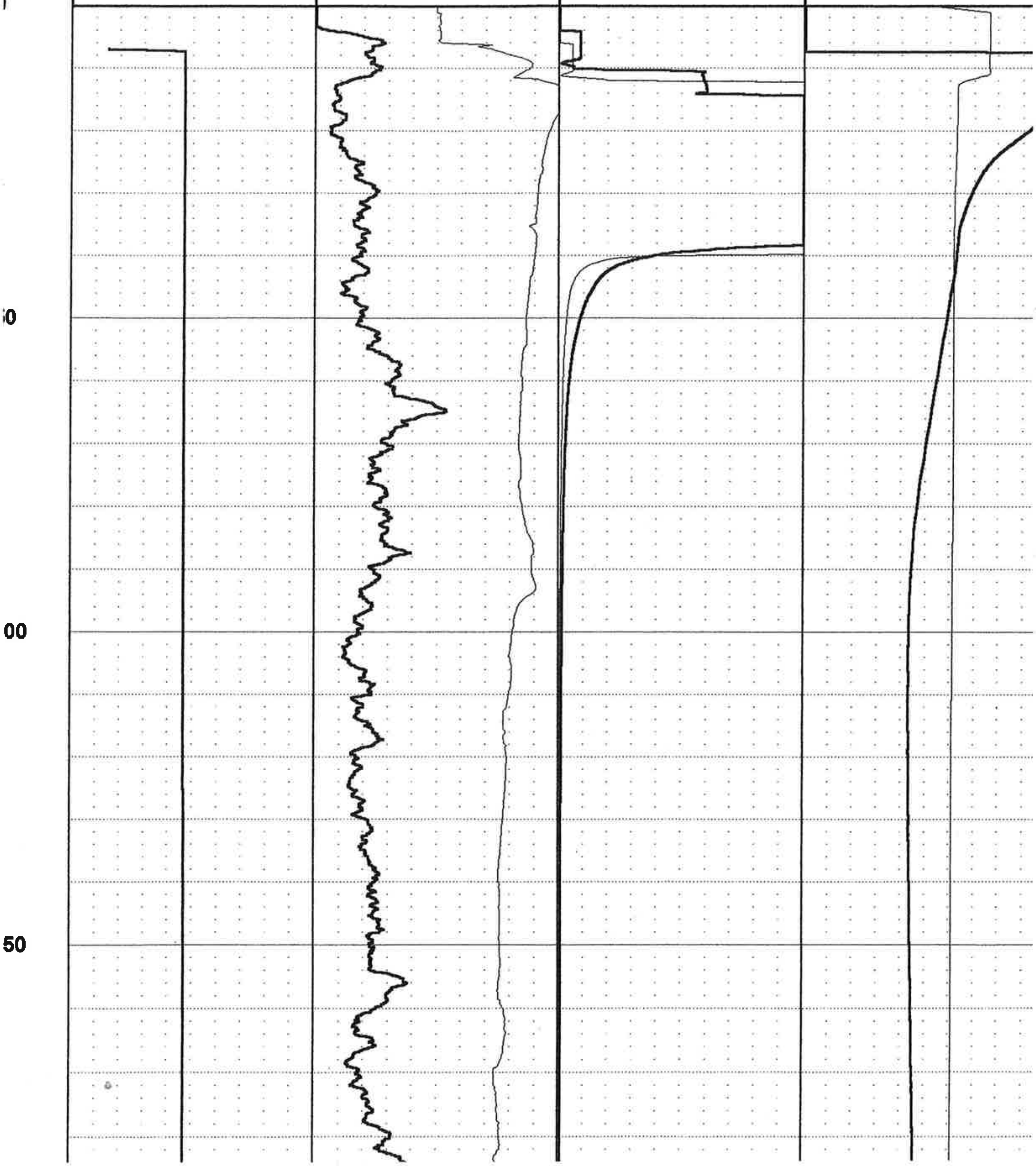
Gainesville, Florida 32604
Phone 352-3725950

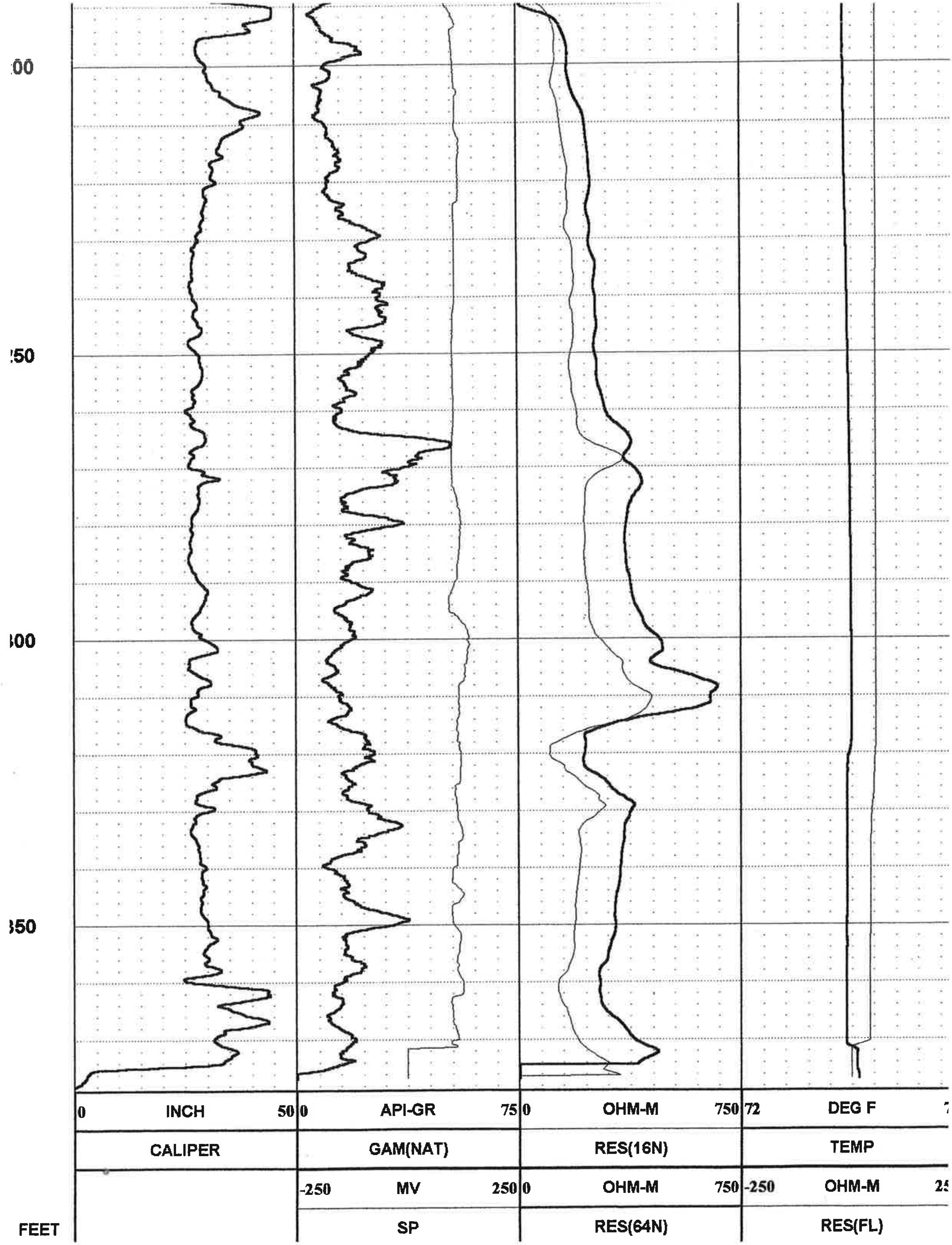
Well #13

:OMPANY	: COLINAS GROUP	OTHER SERVICES:			
VELL	: Well #13				
.OCATION/FIELD	: REEDY CREEK ENERGY SERVICES				
:OUNTY	: ORANGE				
;TATE	: FL				
;ECTION	: ..	TOWNSHIP	: .	RANGE	: ..
)ATE	: 08/17/00	PERMANENT DATUM	:	ELEVATIONS:	
)EPTH DRILLER	: 400'	ELEV. PERM. DATUM	:	KB	:
.OG BOTTOM	: 378.40	LOG MEASURED FROM:	PAD	DF	:
.OG TOP	: 7.00	DRL MEASURED FROM:		GL	:
:ASING DRILLER	: 190	LOGGING UNIT	: BWT		
:ASING TYPE	: STEEL	FIELD OFFICE	: GVL		
:ASING THICKNESS:	.	RECORDED BY	: MAF		
IT SIZE	: -	BOREHOLE FLUID	: water	FILE	: PROCESSED
IAGNETIC DECL.	:	RM	:	TYPE	: 9065A1
IATRIX DENSITY	:	RM TEMPERATURE	:	LOG	: 5.
LUID DENSITY	:	MATRIX DELTA T	:	PLOT	:
EUTRON MATRIX	:	FLUID DELTA T	: 189	THRESH:	5000

EMARKS:

FEET		SP	RES(64N)	RES(FL)
		-250 MV 250	0 OHM-M 750	-250 OHM-M 25
	CALIPER	GAM(NAT)	RES(16N)	TEMP
	0 INCH 50	0 API-GR 75	0 OHM-M 750	72 DEG F 7





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:50
:00
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INCH
50
CALIPER
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API-GR
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GAM(NAT)
-250
MV
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SP
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OHM-M
750
RES(16N)
0
OHM-M
750
RES(64N)
72
DEG F
TEMP
-250
OHM-M
RES(FL)
FEET

Southern Resource Exploration

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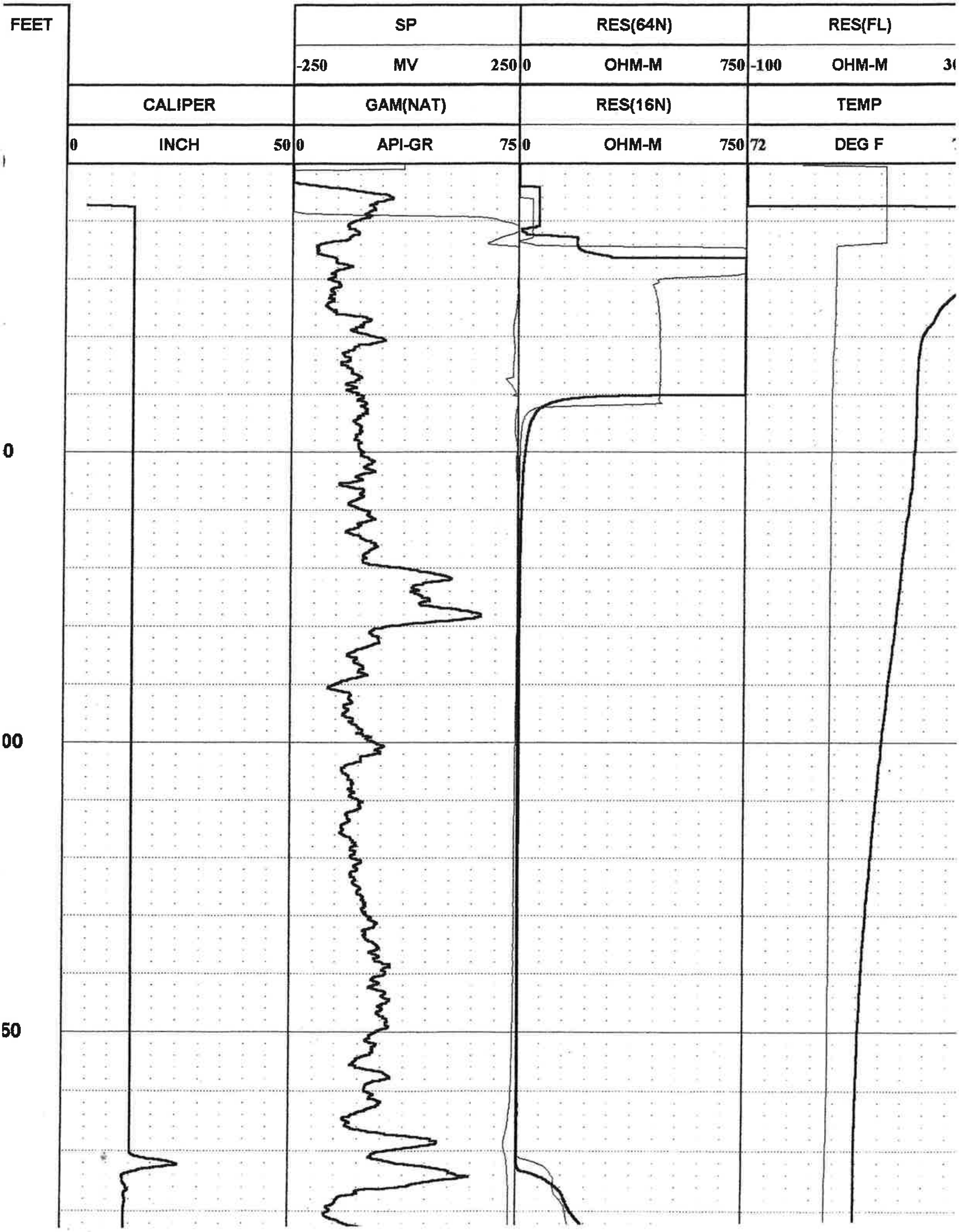
WELL #14

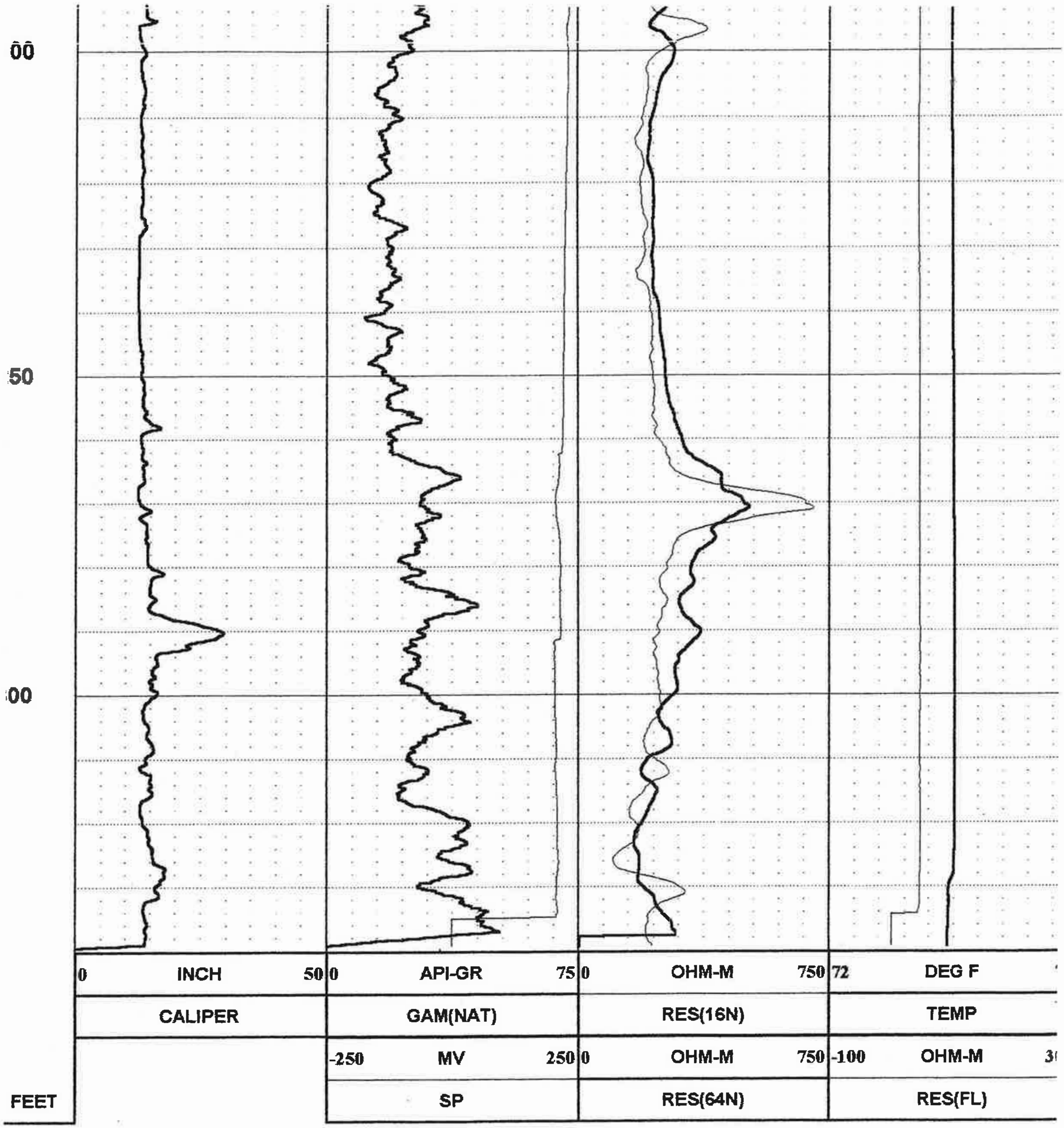
COMPANY : COLINAS GROUP
WELL : WELL #14
LOCATION/FIELD : REEDY CREEK ENERGY SERVICES
COUNTY : ORANGE
STATE : FL

OTHER SERVICES:

SECTION	: ..	TOWNSHIP	: .	RANGE	: ..
DATE	: 08/17/00	PERMANENT DATUM	:	ELEVATIONS:	
DEPTH DRILLER	: 400'	ELEV. PERM. DATUM	:	KB	:
LOG BOTTOM	: 339.80	LOG MEASURED FROM:	PAD	DF	:
LOG TOP	: 7.20	DRL MEASURED FROM :		GL	:
CASING DRILLER	: 190	LOGGING UNIT	: BWT		
CASING TYPE	: STEEL	FIELD OFFICE	: GVL		
CASING THICKNESS:	.	RECORDED BY	: MAF		
BIT SIZE	: -	BOREHOLE FLUID	: WATER	FILE	: PROCESSED
MAGNETIC DECL.	:	RM	:	TYPE	: 9065A1
MATRIX DENSITY	:	RM TEMPERATURE	:	LOG	: 6.
FLUID DENSITY	:	MATRIX DELTA T	:	PLOT	:
NEUTRON MATRIX	:	FLUID DELTA T	: 189	THRESH:	5000

REMARKS:


FEET
SP
-250 MV 250
RES(64N)
0 OHM-M 750
RES(FL)
-100 OHM-M 3
CALIPER
0 INCH 50
GAM(NAT)
0 API-GR 75
RES(16N)
0 OHM-M 750
TEMP
72 DEG F
0
00
50



00
50
00
0 INCH 50
CALIPER
0 API-GR 75
GAM(NAT)
-250 MV 250
SP
0 OHM-M 750
RES(16N)
0 OHM-M 750
RES(64N)
72 DEG F
TEMP
-100 OHM-M
RES(FL)
FEET

Southern Resource Exploration

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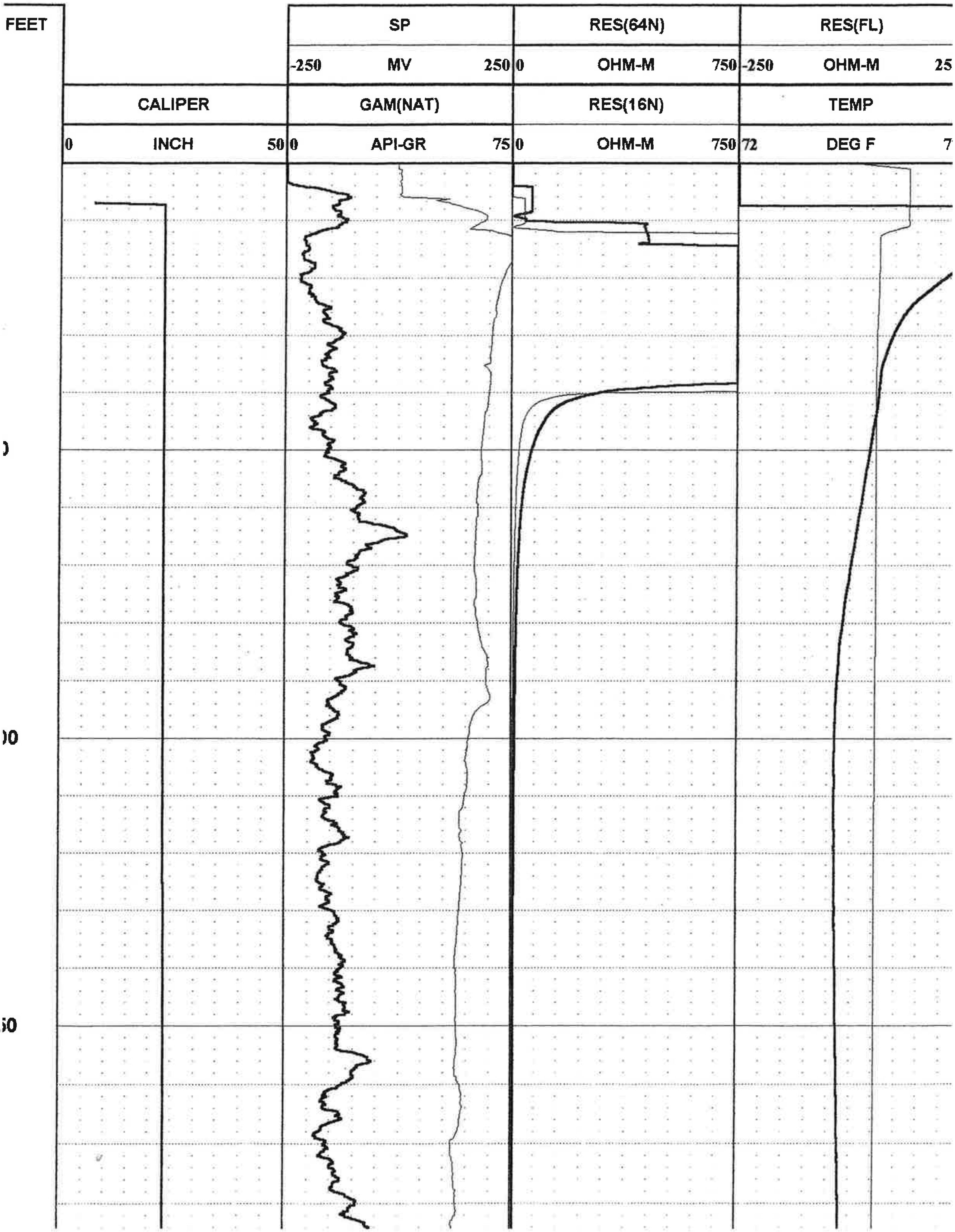
Phone 352-3725950

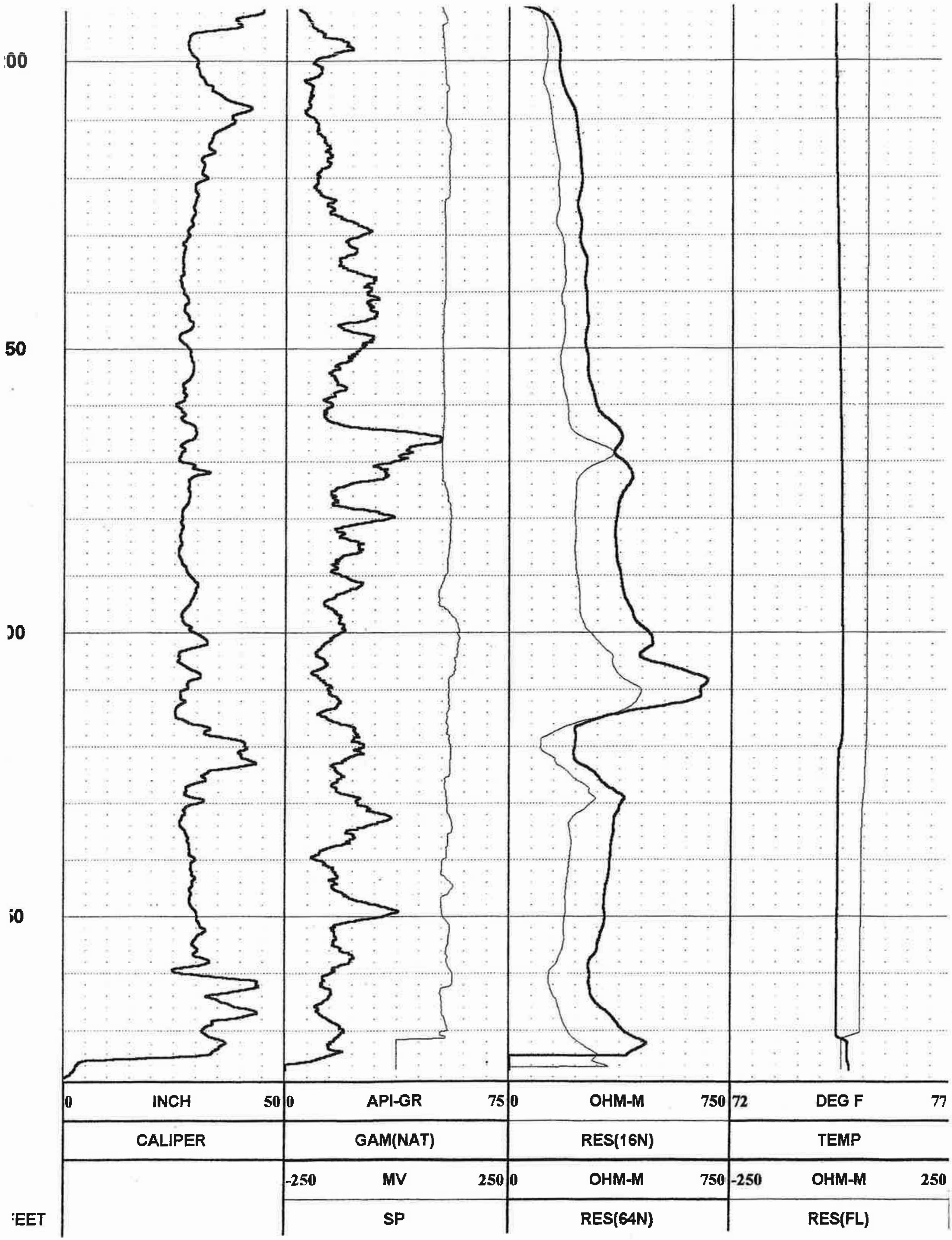
Well #13

COMPANY	: COLINAS GROUP	OTHER SERVICES:			
WELL	: Well #13				
LOCATION/FIELD	: REEDY CREEK ENERGY SERVICES				
COUNTY	: ORANGE				
STATE	: FL				
SECTION	: ..	TOWNSHIP	: .	RANGE	: ..
DATE	: 08/17/00	PERMANENT DATUM	:	ELEVATIONS:	
DEPTH DRILLER	: 400'	ELEV. PERM. DATUM	:	KB	:
LOG BOTTOM	: 378.40	LOG MEASURED FROM	: PAD	DF	:
LOG TOP	: 7.00	DRL MEASURED FROM	:	GL	:
CASING DRILLER	: 190	LOGGING UNIT	: BWT		
CASING TYPE	: STEEL	FIELD OFFICE	: GVL		
CASING THICKNESS	: .	RECORDED BY	: MAF		
BIT SIZE	: -	BOREHOLE FLUID	: water	FILE	: PROCESSED
MAGNETIC DECL.	:	RM	:	TYPE	: 9065A1
MATRIX DENSITY	:	RM TEMPERATURE	:	LOG	: 5.
FLUID DENSITY	:	MATRIX DELTA T	:	PLOT	:
NEUTRON MATRIX	:	FLUID DELTA T	: 189	THRESH:	5000

REMARKS:



FEET
SP
-250 MV 250
RES(64N)
0 OHM-M 750
RES(FL)
-250 OHM-M 25
CALIPER
0 INCH 50
GAM(NAT)
0 API-GR 75
RES(16N)
0 OHM-M 750
TEMP
72 DEG F



00
50
00
50
0 INCH 50
CALIPER
0 API-GR 75
GAM(NAT)
-250 MV 250
SP
0 OHM-M 750
RES(16N)
0 OHM-M 750
RES(64N)
72 DEG F 77
TEMP
-250 OHM-M 250
RES(FL)
EET

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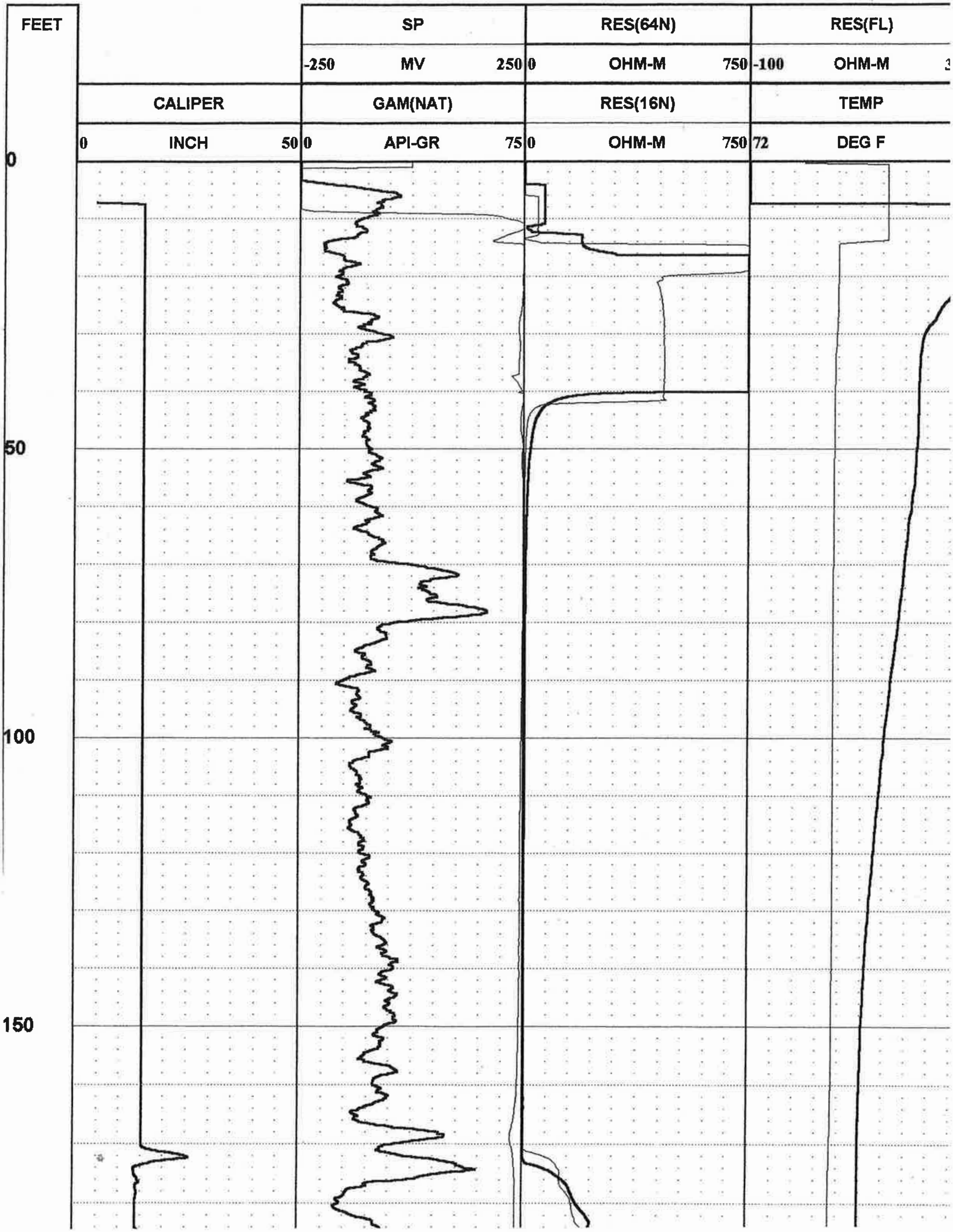
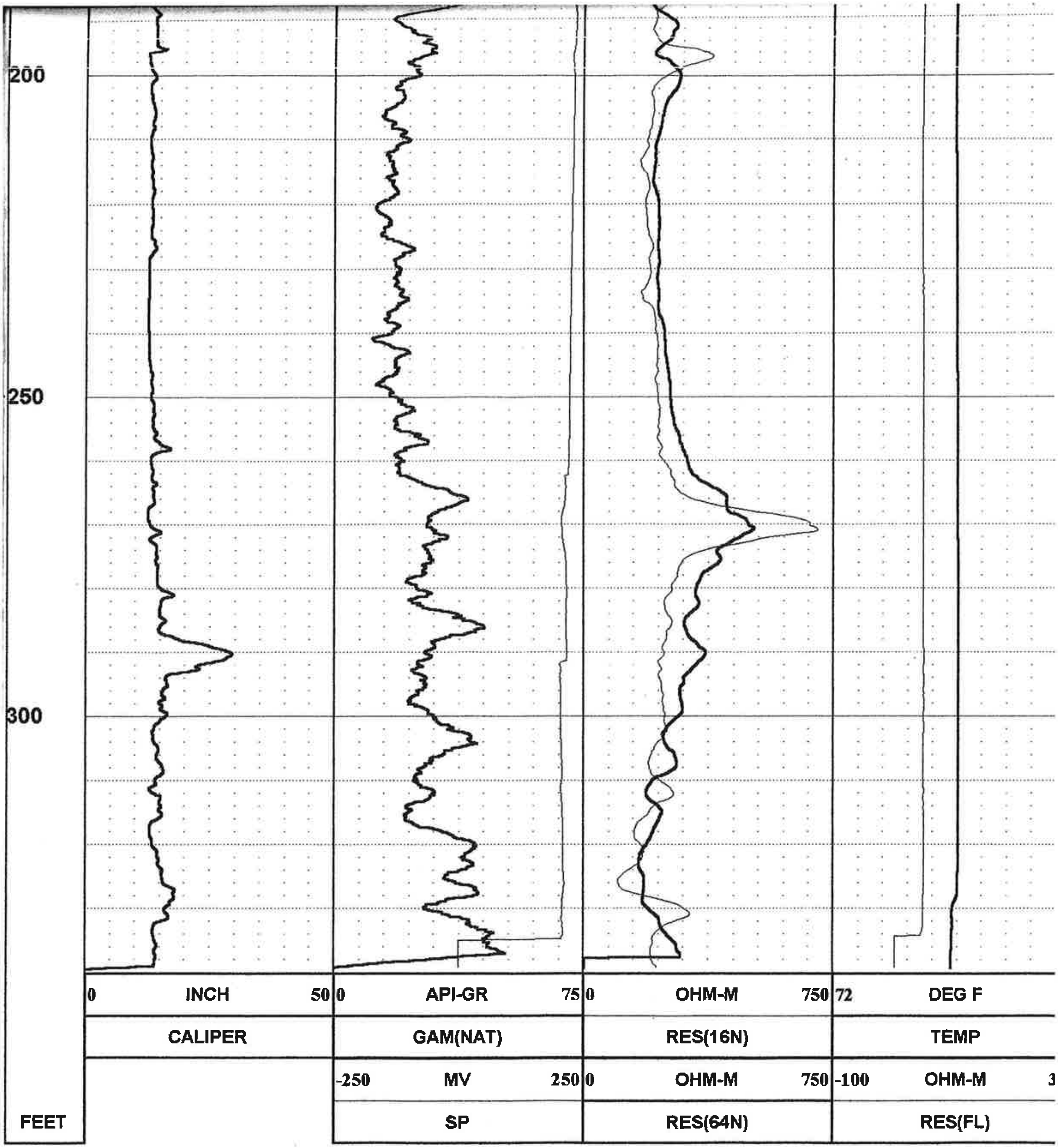
WELL #14

COMPANY	: COLINAS GROUP			OTHER SERVICES:	
WELL	: WELL #14				
LOCATION/FIELD	: REEDY CREEK ENERGY SERVICES				
COUNTY	: ORANGE				
STATE	: FL				
SECTION	: ..	TOWNSHIP	: ..	RANGE	: ..
DATE	: 08/17/00	PERMANENT DATUM	:	ELEVATIONS:	
DEPTH DRILLER	: 400'	ELEV. PERM. DATUM	:	KB	:
LOG BOTTOM	: 339.80	LOG MEASURED FROM	: PAD	DF	:
LOG TOP	: 7.20	DRL MEASURED FROM	:	GL	:
CASING DRILLER	: 190	LOGGING UNIT	: BWT		
CASING TYPE	: STEEL	FIELD OFFICE	: GVL		
CASING THICKNESS	: .	RECORDED BY	: MAF		
BIT SIZE	: -	BOREHOLE FLUID	: WATER	FILE	: PROCESSED
MAGNETIC DECL.	:	RM	:	TYPE	: 9065A1
MATRIX DENSITY	:	RM TEMPERATURE	:	LOG	: 6.
FLUID DENSITY	:	MATRIX DELTA T	:	PLOT	:
NEUTRON MATRIX	:	FLUID DELTA T	: 189	THRESH:	5000

REMARKS:


FEET
SP
-250 MV 250
RES(64N)
0 OHM-M 750
RES(FL)
-100 OHM-M
CALIPER
0 INCH 50
GAM(NAT)
0 API-GR 75
RES(16N)
0 OHM-M 750
TEMP
72 DEG F
0
50
100
150


200
250
300
FEET
0 INCH 50
CALIPER
0 API-GR 75
GAM(NAT)
-250 MV 250
SP
0 OHM-M 750
RES(16N)
0 OHM-M 750
RES(64N)
72 DEG F
TEMP
-100 OHM-M 3
RES(FL)