

**PCDC - Pressure Case Directional
PCGK - Pressure Case Gamma**



1 : 600 / 1 : 240

Country : USA		
Field : Wattenberg		
Location : Lat: 40° 30' 16.06" North Long: 104° 21' 17.82" West		
Well : Wells Ranch AE08-69-1HN		
Company : Noble		
Rig : H&P 321		
LOCATION	Company : Noble	Other Services
	Rig : H&P 321	
	Well : Wells Ranch AE08-69-1HN	Directional Services
	Field : Wattenberg	
	Country : USA	
	API Number : 0512335643	
	Latitude : 40° 30' 16.06" North	
	Longitude : 104° 21' 17.82" West	
	UTM Easting = 3,318,408.02 ft	
	UTM Northing = 1,428,671.51 ft	

Permanent Datum : Ground Level	Elevation : 4988.00 ft	Elev. KB N/A
Log Measured From : Drill Floor	30.00 ft Above Permanent Datum	DF 5018.00 ft
Drilling Measured From : Drill Floor	MD LOG	GL 4988.00 ft
		WD N/A

Depth Logged : 794.00 ft To 11,296.00 ft	Unit No. : 11210424	Job No. : CA-XX-0009759227
Date Logged : 19-Sep-12 To 26-Sep-12	Plot Type : Final	
Total Depth MD : 11,296.00 ft TVD : 6,768.72 ft	Plot Date : 26-Sep-12	
Spud Date : 19-Sep-12		

Run No.	Borehole Record (MD)		Run No.	Borehole Record (MD)	
	Size	From To		Size	From To
2	8.750 in	794.00 ft To 6,186.00 ft			
3	8.750 in	6,186.00 ft To 7,323.00 ft			
4	6.125 in	7,323.00 ft To 11,296.00 ft			
			Casing Record (MD)		
			Size	Weight	From To
			9.625 in	36.00 lbpf	SURFACE 794.00 ft
			7.000 in	24.00 lbpf	SURFACE 7,313.00 ft

WELL INFORMATION

MWD Run Number	100	200	300
Date run completed	21-Sep-12	22-Sep-12	26-Sep-12
Rig Bit Number	2	3	4
Bit Size (in)	8.750	8.750	6.125
Tool Nominal OD (in)	6.750	6.750	4.750
Log Start Depth (MD, ft)	794.00	6,186.00	7,323.00
Log End Depth (MD, ft)	6,186.00	7,323.00	11,296.00
Drill or Wipe	Drill	Drill	Drill
Drill/Wipe Start Date and Time	19-Sep-12 19:15	21-Sep-12 08:00	23-Sep-12 21:26
Drill/Wipe End Date and Time	20-Sep-12 23:30	22-Sep-12 14:30	25-Sep-12 19:10
Min Inc (deg) @ Depth (MD, ft)	.15 @ 5,812.00	1.09 @ 6,189.00	84.76 @ 7,332.00
Max Inc (deg) @ Depth (MD, ft)	19.63 @ 4,010.00	81.60 @ 7,272.00	92.71 @ 7,696.00
Bit TFA(in2) / Bit Type	.75 / PDC	.86 / PDC	.46 / PDC
Flow Rate (gpm)	591.40	540.00	270.00
Max AV (fpm) / CV (fpm) @ MWD	425.3 / 135.9	300.0 / 300.0	300.0 / 300.0
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel
Density (ppg) / Viscosity (spqt)	9.25 / 30.00	10.20 / 48.00	9.38 / 32.00
Filtrate CL (ppm)	2,200.00	1,900.00	2,250.00
pH / Fluid Loss (mptm)	9.00 / 26	9.50 / 40	9.60 / 10
PV (cP) / YP (Ihf2)	1 / 4.00	16 / 16.00	7 / 4.00
% Solids / % Sand	5.00 / 1.25	3.7 / 0.5	5.60 / 0.30
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A

Max Tool Temp (degF) / Source	154.30 / PCM	170.37 / PCM	221.80 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Adam Sampson	Adam Sampson	Adam Sampson		
Customer Representative	Roger Foster	Roger Foster	Roger Foster		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.76	5.76	5.76		
Sub Serial Number	11341325	11341325	11706795		
Insert Serial Number	11680742	11680742	11680798		
Date and Time Initialized	19-Sep-12 13:40	19-Sep-12 13:40	23-Sep-12 04:03		
Date and Time Read	23-Sep-12 01:43	23-Sep-12 01:50	26-Sep-12 08:19		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	51.00	51.00	61.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341325	11341325	11706795		
Sonde Serial Number	11833233	11833233	11145699		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	50.42	70.30	312.48		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	54.02	54.02	64.07		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341325	11341325	11706795		
Insert/Sonde Serial Number	11292601	11292601	11293406		

REMARKS

1. All depths are calibrated to driller's pipe tally and are measured depth from the Drill Floor.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annular velocities are calculated using the "Power Law" model for water based fluids and the "Brigham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified.
5. The following smoothing parameters have been applied to the data:
PGRC (Gamma CG):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
Gap Fill: 3.0 ft

ROPA (Average Rate Of Penetration):
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft
6. Insite Version 7.4.1

WARRANTY


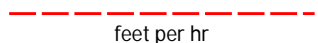
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY OTHER THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION AND PRODUCTION OPERATION. HALLIBURTON MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HALLIBURTON BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HALLIBURTON.

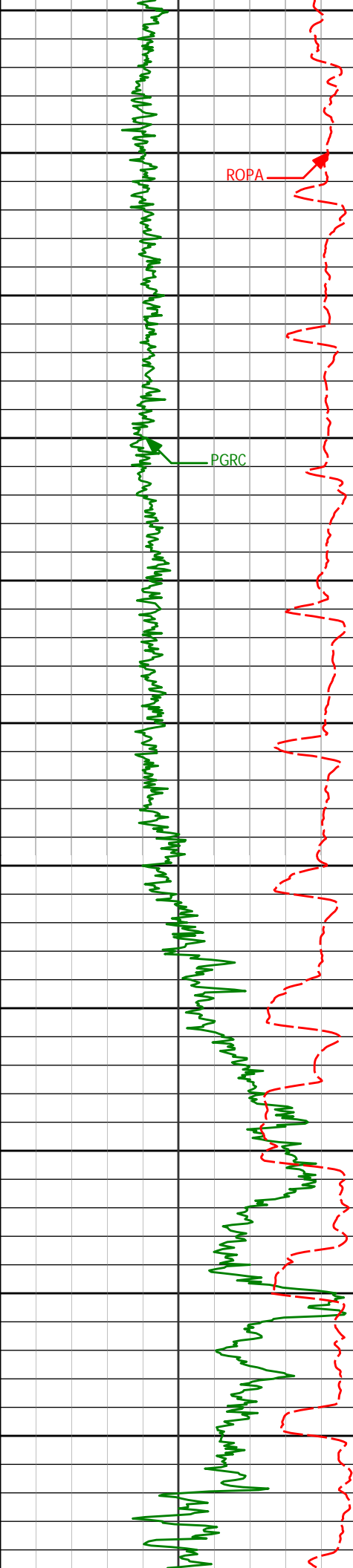
HALLIBURTON

Sperry Drilling Services

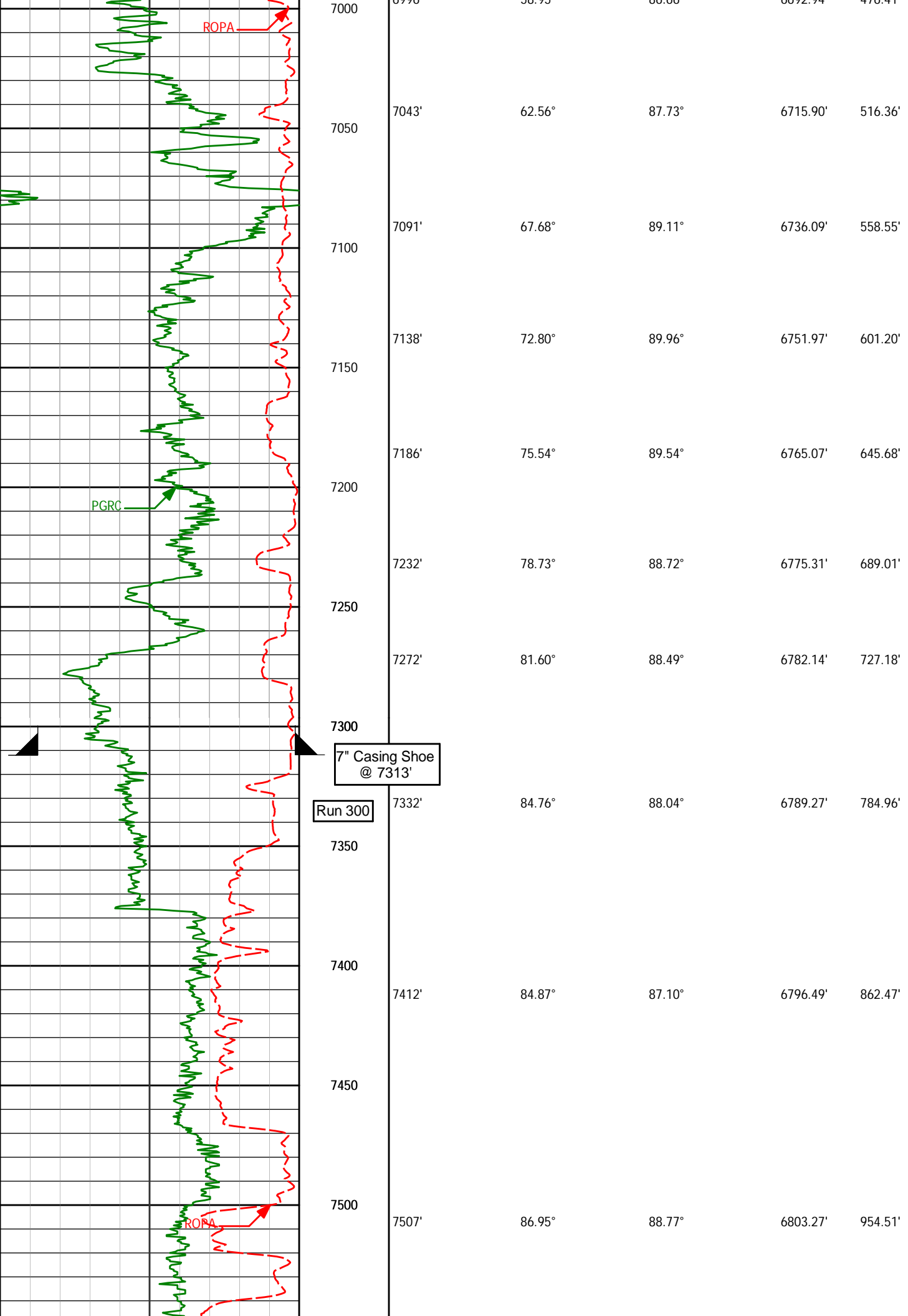
MD Main Log 1:600

Noble Energy
Wells Ranch AE08-69-1HN
H&P 321
T6N-R62W

PCG Gamma Ray PGRC 	0	300						
ROP Average ROPA 	1K	0	Depth ft	<i>Depth</i>	<i>Inc.</i>	<i>Azi.</i>	<i>TVD</i>	<i>V.S.</i>
			6200					
			Run 200					
			KOP					
			6250					
			6284'	4.94°	76.31°	6119.67'	110.31'	
			6300					
			6332'	9.18°	72.52°	6167.29'	116.21'	
			6350					
			6378'	13.23°	72.07°	6212.41'	125.14'	
			6400					
			6426'	17.26°	77.08°	6258.71'	137.75'	



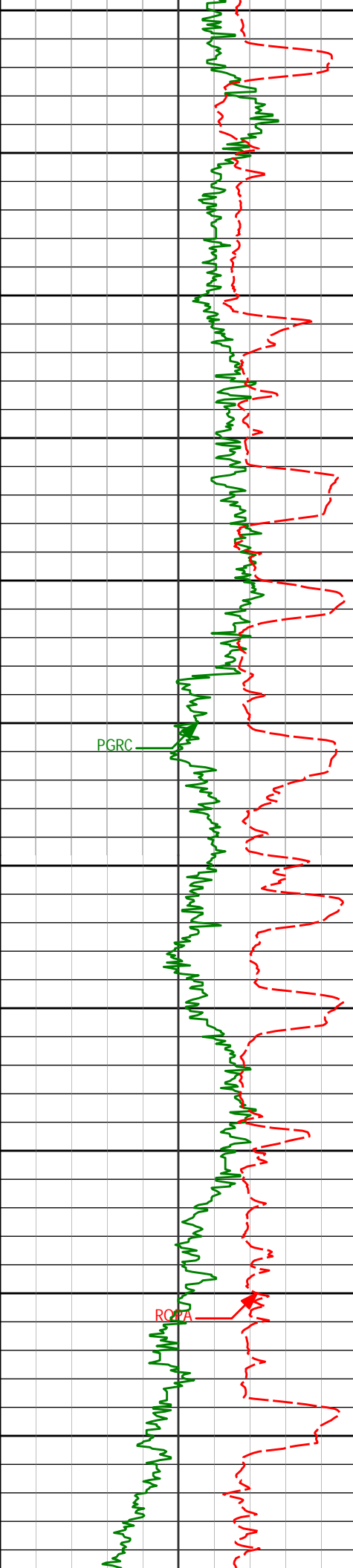
6450				
6473'	20.61°	83.50°	6303.17'	152.88'
6500				
6521'	24.15°	86.43°	6347.54'	170.82'
6550				
6568'	27.72°	86.55°	6389.80'	190.91'
6600				
6616'	31.58°	86.51°	6431.51'	214.10'
6650				
6663'	35.44°	88.43°	6470.69'	239.34'
6700				
6711'	40.01°	90.22°	6508.65'	267.67'
6750				
6758'	44.55°	90.00°	6543.42'	298.07'
6800				
6806'	47.58°	90.33°	6576.72'	331.30'
6850				
6853'	48.90°	90.80°	6608.02'	364.93'
6900				
6901'	51.42°	88.96°	6638.77'	400.42'
6950				
6948'	55.19°	86.40°	6666.85'	437.06'
6996'	58.95°	86.66°	6692.91'	476.41'



7" Casing Shoe
@ 7313'

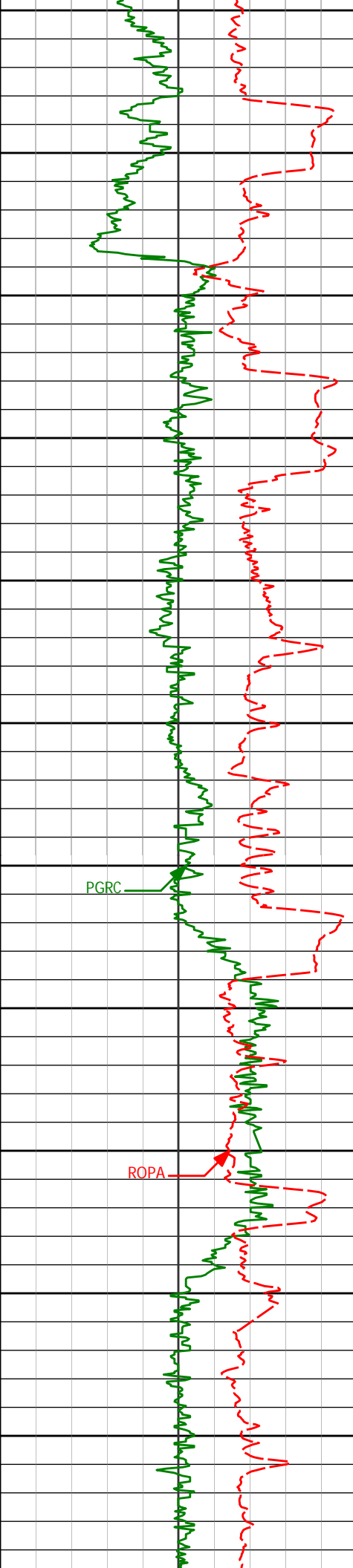
Run 300

7000	6990	38.95	88.00	6692.94	470.41
7043'		62.56°	87.73°	6715.90'	516.36'
7050					
7091'		67.68°	89.11°	6736.09'	558.55'
7100					
7138'		72.80°	89.96°	6751.97'	601.20'
7150					
7186'		75.54°	89.54°	6765.07'	645.68'
7200					
7232'		78.73°	88.72°	6775.31'	689.01'
7250					
7272'		81.60°	88.49°	6782.14'	727.18'
7300					
7332'		84.76°	88.04°	6789.27'	784.96'
7350					
7400					
7412'		84.87°	87.10°	6796.49'	862.47'
7450					
7500					
7507'		86.95°	88.77°	6803.27'	954.51'



7550
7600
7650
7700
7750
7800
7850
7900
7950
8000
8050

7602'	90.06°	89.07°	6805.75'	1046.35'
7696'	92.71°	89.61°	6803.48'	1137.05'
7791'	91.63°	87.95°	6799.88'	1228.92'
7886'	90.15°	88.32°	6798.40'	1321.11'
7981'	90.03°	87.94°	6798.24'	1413.32'
8076'	91.26°	89.09°	6797.17'	1505.36'



8100
8150
8200
8250
8300
8350
8400
8450
8500
8550
8600

8171' 91.20° 89.31° 6795.13' 1597.10'

8266' 87.57° 86.51° 6796.15' 1689.36'

8361' 90.40° 86.51° 6797.83' 1782.16'

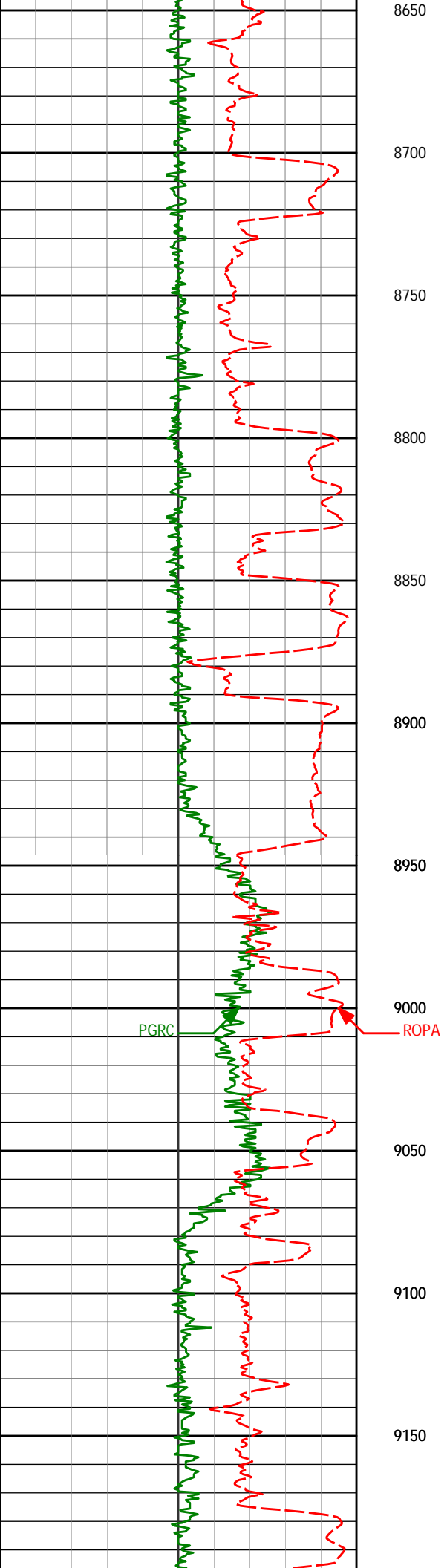
8456' 89.88° 88.15° 6797.60' 1874.67'

8551' 89.14° 86.25° 6798.42' 1967.22'

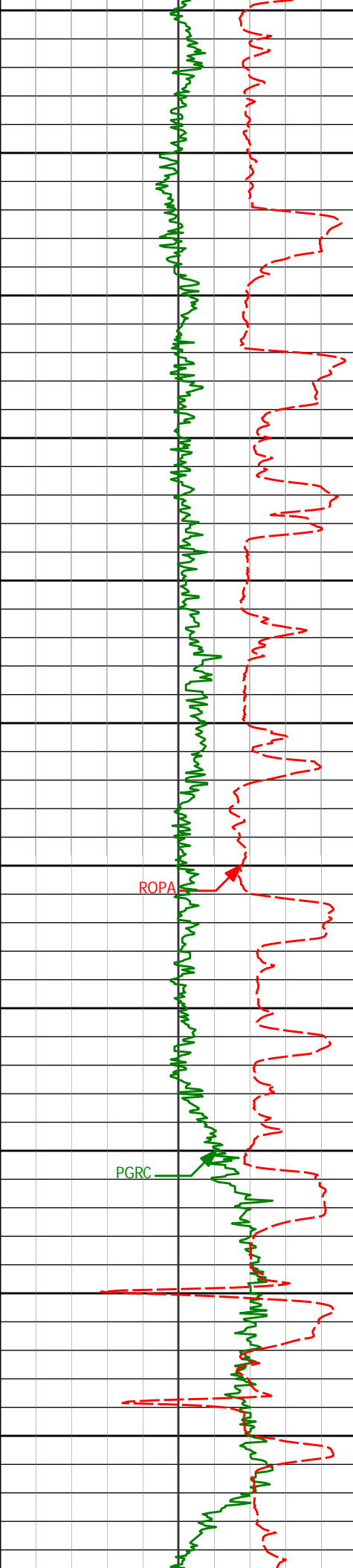
8645' 90.31° 85.73° 6798.88' 2059.24'

PGRC

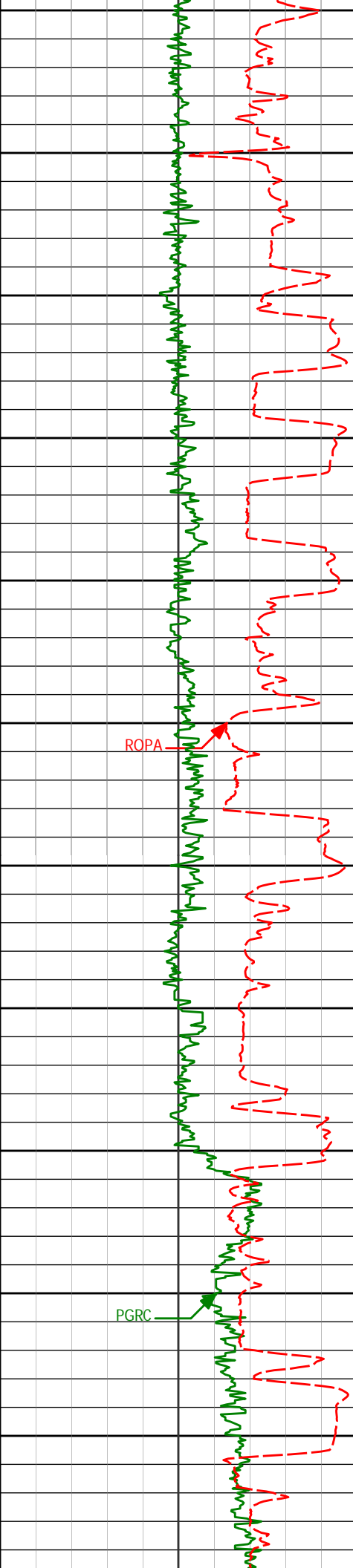
ROPA



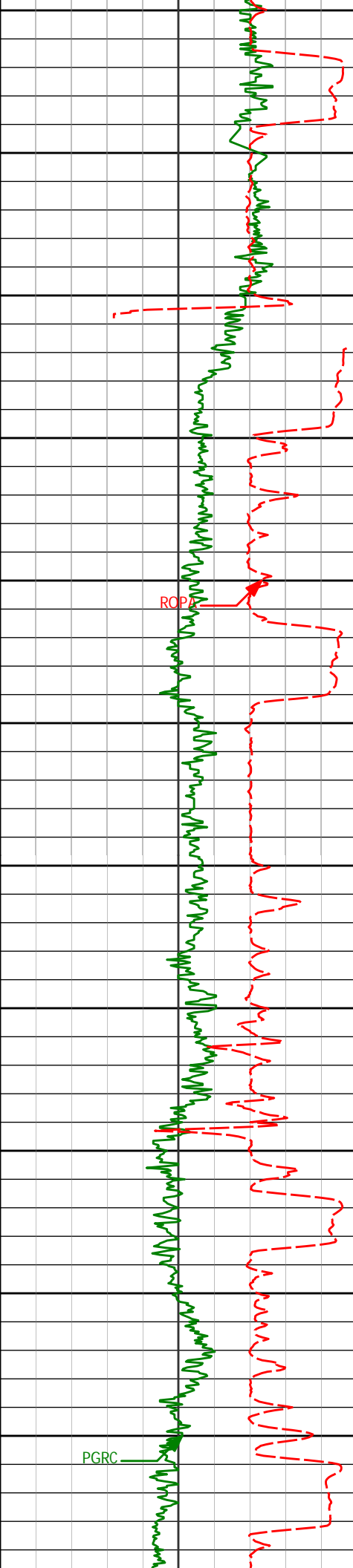
8740'	90.18°	84.81°	6798.47'	2152.47'
8835'	90.59°	84.21°	6797.83'	2245.93'
8930'	91.73°	90.60°	6795.91'	2338.35'
9025'	90.59°	91.03°	6793.99'	2429.37'
9120'	90.37°	90.05°	6793.20'	2520.53'



9200				
9215'	88.95°	88.81°	6793.76'	2612.18'
9250				
9300				
9310'	92.56°	89.94°	6792.51'	2703.85'
9350				
9400				
9404'	89.11°	89.13°	6791.15'	2794.48'
9450				
9500				
9499'	91.75°	89.68°	6790.44'	2886.14'
9550				
9600				
9594'	91.54°	89.20°	6787.71'	2977.76'
9650				
9689'	89.42°	88.69°	6786.91'	3069.62'
9700				



Y-Coordinate	Value 1	Value 2	Value 3	Value 4
9784'	90.62°	87.43°	6786.89'	3161.85'
9879'	88.98°	84.09°	6787.22'	3254.91'
9974'	89.26°	87.32°	6788.68'	3347.98'
10069'	91.02°	88.63°	6788.44'	3440.24'
10164'	92.13°	90.31°	6785.83'	3531.85'
10258'	90.80°	90.05°	6783.43'	3622.18'

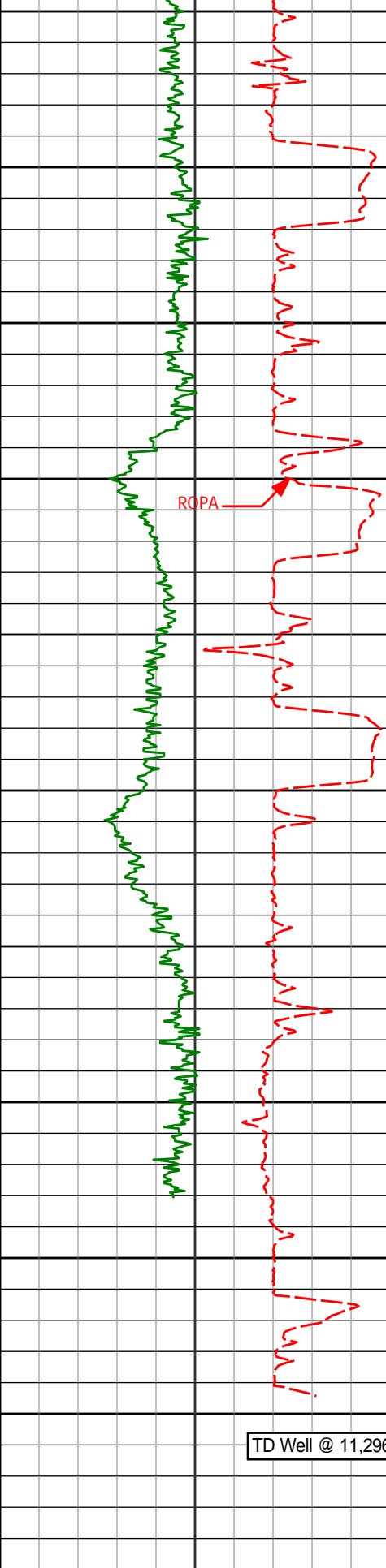


10300
10350
10400
10450
10500
10550
10600
10650
10700
10750
10800

10353'	91.11°	89.28°	6781.85'	3713.73'
10448'	90.34°	89.41°	6780.64'	3805.42'
10543'	89.91°	89.51°	6780.44'	3897.07'
10638'	91.73°	89.06°	6779.09'	3988.79'
10733'	92.31°	87.66°	6775.74'	4080.84'
10828'	91.11°	86.37°	6772.90'	4173.43'

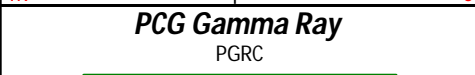
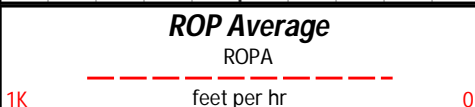
ROPA

PGRC



10850					
10900					
10923'	89.63°	85.88°	6772.29'	4266.37'	
10950					
11000					
11018'	91.48°	88.33°	6771.37'	4358.96'	
11050					
11100					
11113'	89.57°	89.33°	6770.50'	4450.87'	
11150					
11200					
11208'	91.66°	88.17°	6769.47'	4542.81'	
11235'	90.28°	86.47°	6769.02'	4569.10'	
11250					
11300					
11296'	90.28°	86.47°	6768.72'	4628.70'	
11350					

TD Well @ 11,296'



Depth ft	<i>Depth</i>	<i>Inc.</i>	<i>Azi.</i>	<i>TVD</i>	<i>V.S.</i>
-------------	--------------	-------------	-------------	------------	-------------

HALLIBURTON

Sperry Drilling Services

MD Detail Log 1:240

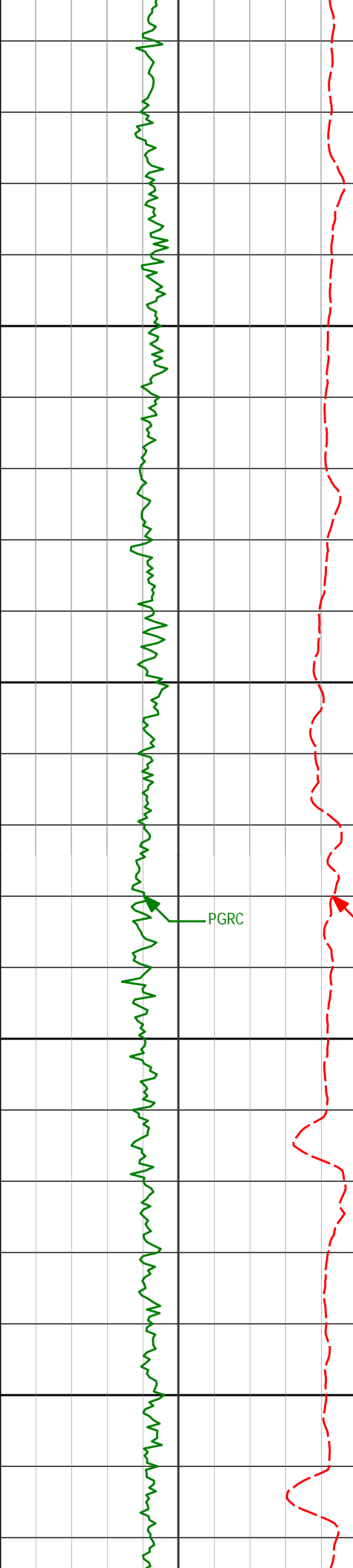
Noble Energy
Wells Ranch AE08-69-1HN
H&P 321
T6N-R62W



Depth ft	Depth	Inc.	Azi.	TVD	V.S.
6200					
	Run 200				
6250					
6284'		4.94°	76.31°	6119.67'	110.31'
6300					
6332'		9.18°	72.52°	6167.29'	116.21'
6350					

PGRC

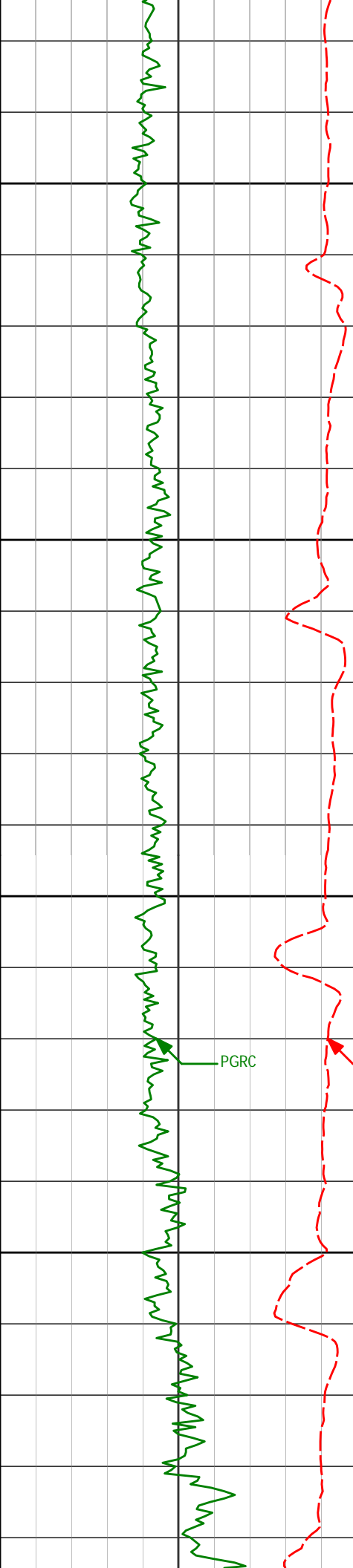
ROPA



6378'	13.23°	72.07°	6212.41'	125.14'
6426'	17.26°	77.08°	6258.71'	137.75'
6473'	20.61°	83.50°	6303.17'	152.88'
6521'	24.15°	86.43°	6347.54'	170.82'
6568'	27.72°	86.55°	6389.80'	190.91'

PGRC

ROPA



6600

6616'

31.58°

86.51°

6431.51'

214.10'

6650

6663'

35.44°

88.43°

6470.69'

239.34'

6700

6711'

40.01°

90.22°

6508.65'

267.67'

PGRC

ROPA

6750

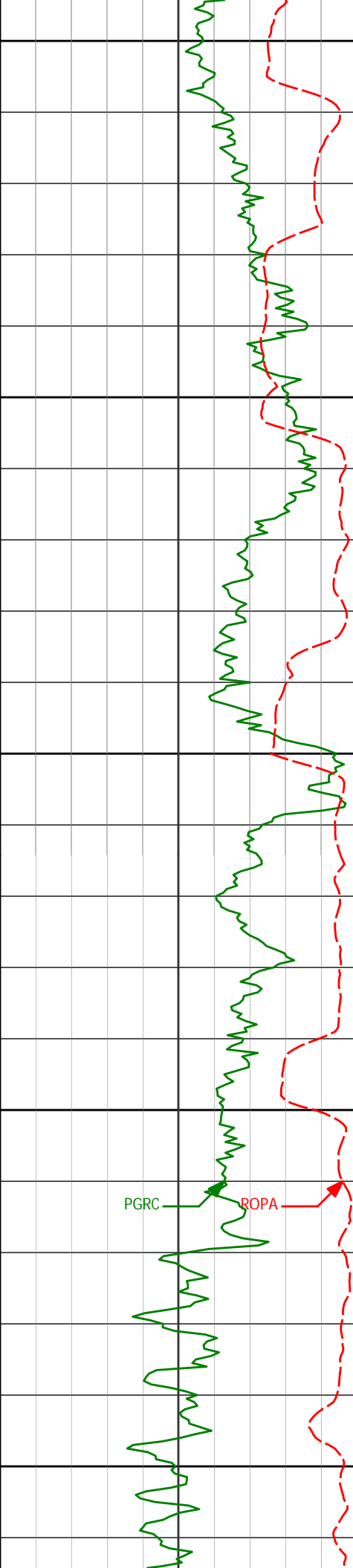
6758'

44.55°

90.00°

6543.42'

298.07'



6800

6806'

47.58°

90.33°

6576.72'

331.30'

6850

6853'

48.90°

90.80°

6608.02'

364.93'

6900

6901'

51.42°

88.96°

6638.77'

400.42'

6950

6948'

55.19°

86.40°

6666.85'

437.06'

PGRC

ROPA

7000

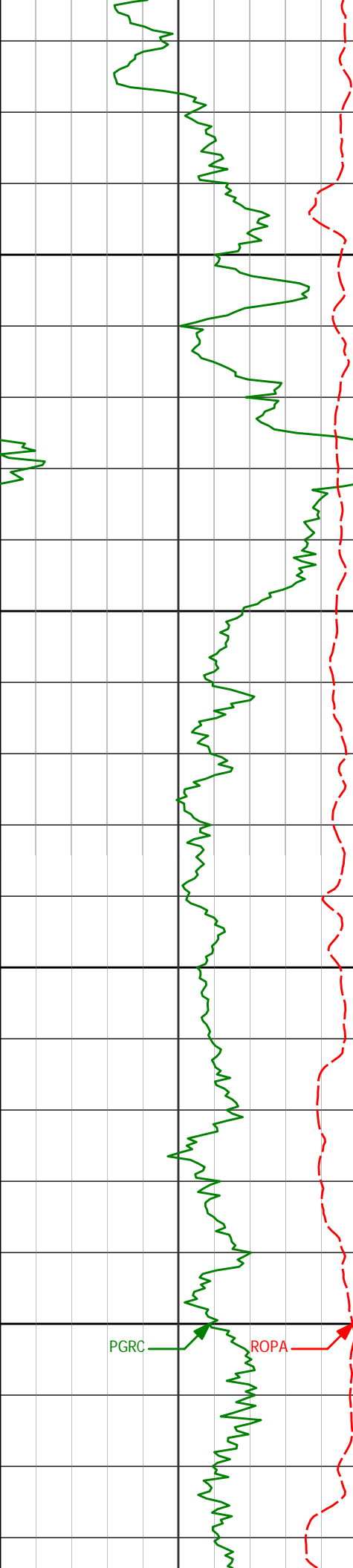
6996'

58.95°

86.66°

6692.94'

476.41'



7043' 62.56° 87.73° 6715.90' 516.36'

7050

7091' 67.68° 89.11° 6736.09' 558.55'

7100

7138' 72.80° 89.96° 6751.97' 601.20'

7150

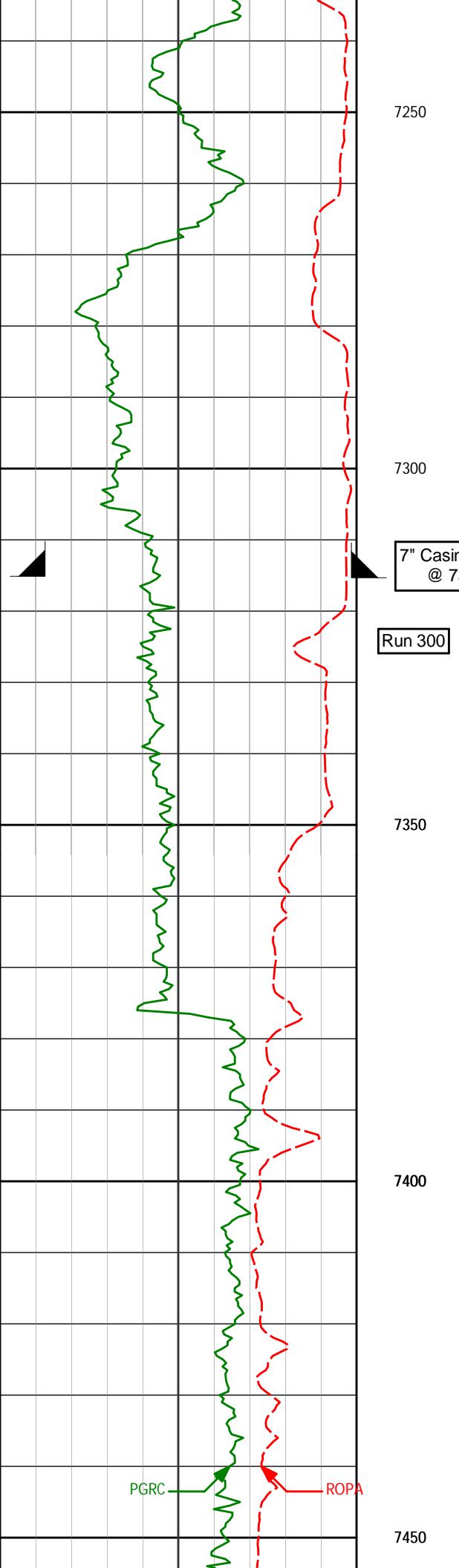
7186' 75.54° 89.54° 6765.07' 645.68'

7200

PGRC

ROPA

7232' 78.73° 88.72° 6775.31' 689.01'



7250

7272'

81.60°

88.49°

6782.14'

727.18'

7300

7" Casing Shoe
@ 7313'

Run 300

7332'

84.76°

88.04°

6789.27'

784.96'

7350

7400

7412'

84.87°

87.10°

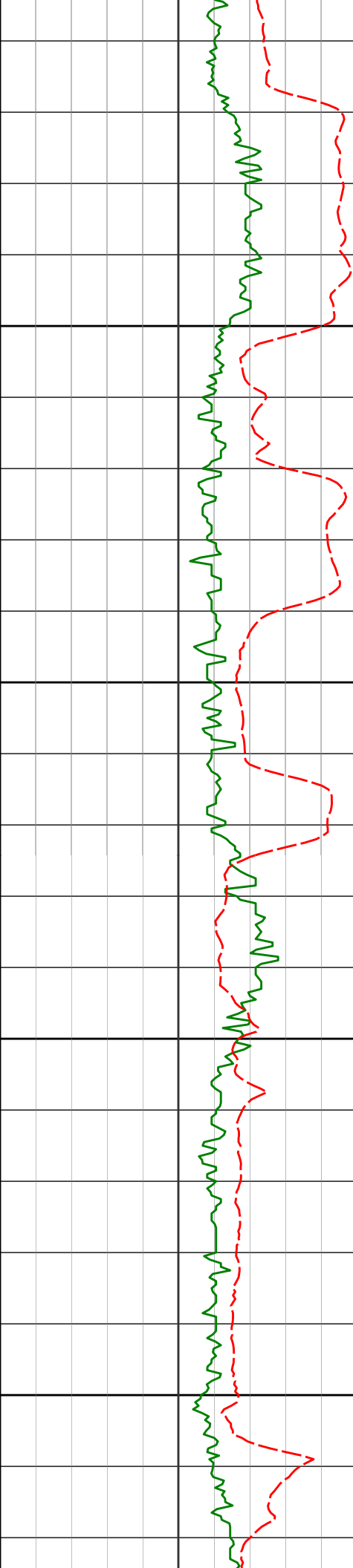
6796.49'

862.47'

PGRC

ROPA

7450



7500

7507'

86.95°

88.77°

6803.27'

954.51'

7550

7600

7602'

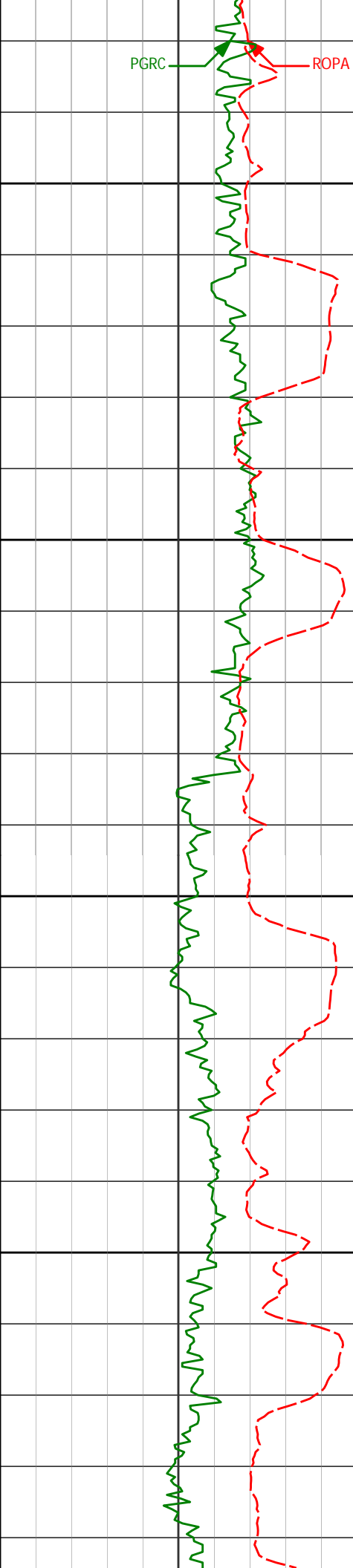
90.06°

89.07°

6805.75'

1046.35'

7650



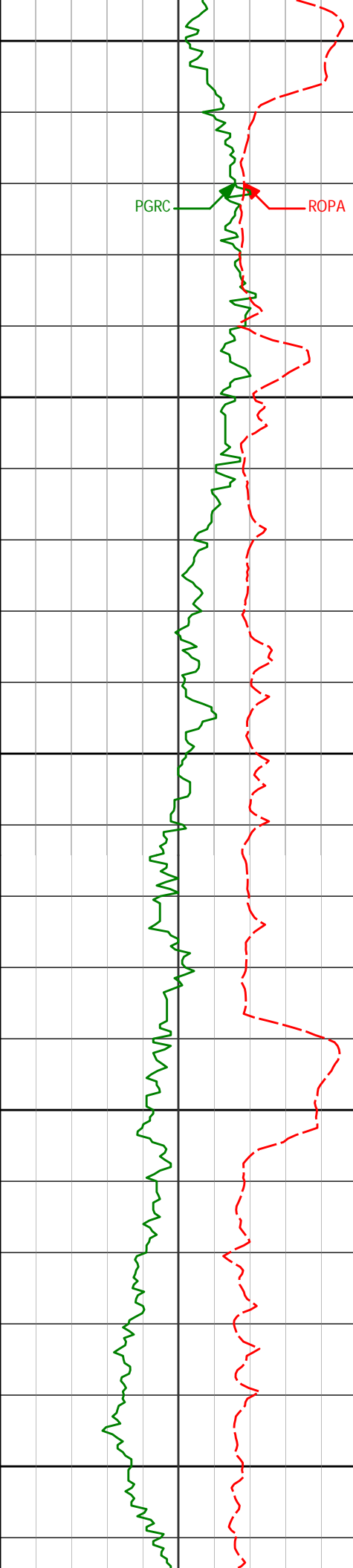
7700 7696' 92.71° 89.61° 6803.48' 1137.05'

7750

7800 7791' 91.63° 87.95° 6799.88' 1228.92'

7850

7886' 90.15° 88.32° 6798.40' 1321.11'



7900

PGRC

ROPA

7950

7981'

90.03°

87.94°

6798.24'

1413.32'

8000

8050

8076'

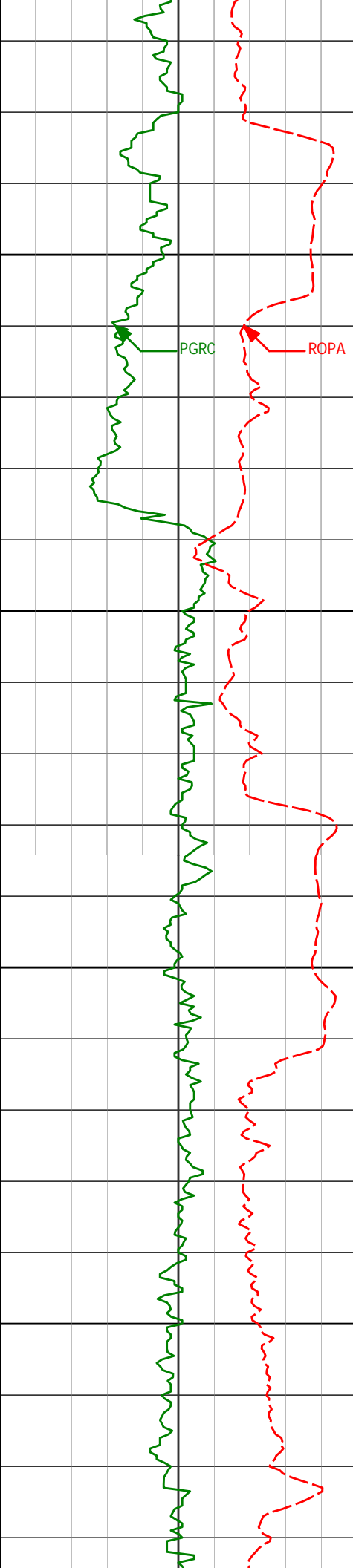
91.26°

89.09°

6797.17'

1505.36'

8100



8150

PGRC
ROPA

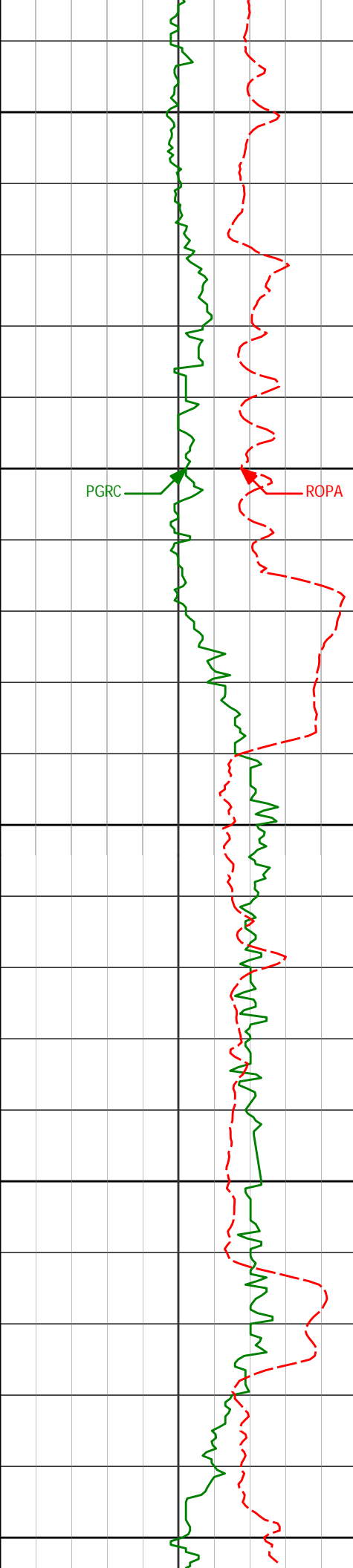
8171' 91.20° 89.31° 6795.13' 1597.10'

8200

8250

8266' 87.57° 86.51° 6796.15' 1689.36'

8300



8350

8361'

90.40°

86.51°

6797.83'

1782.16'

8400

PGRC

ROPA

8450

8456'

89.88°

88.15°

6797.60'

1874.67'

8500

8550

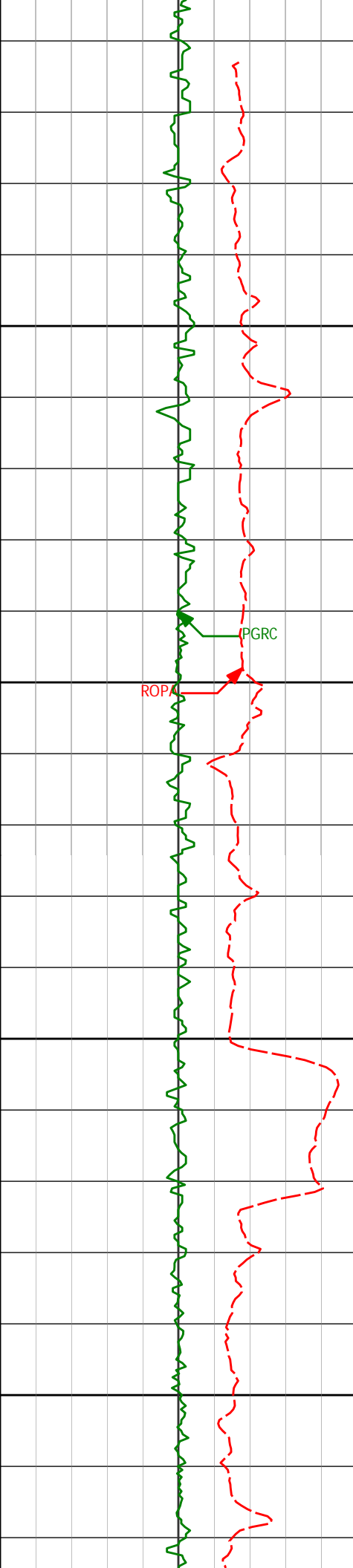
8551'

89.14°

86.25°

6798.42'

1967.22'



8600

8645'

90.31°

85.73°

6798.88'

2059.24'

8650

ROPA

PGRC

8700

8740'

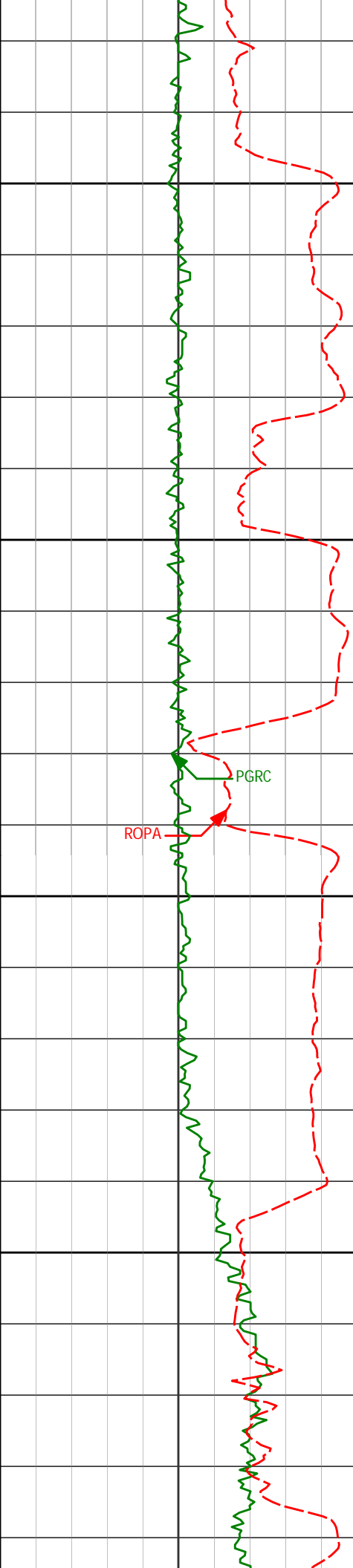
90.18°

84.81°

6798.47'

2152.47'

8750



8800

8835'

90.59°

84.21°

6797.83'

2245.93'

8850

PGRC

ROPA

8900

8930'

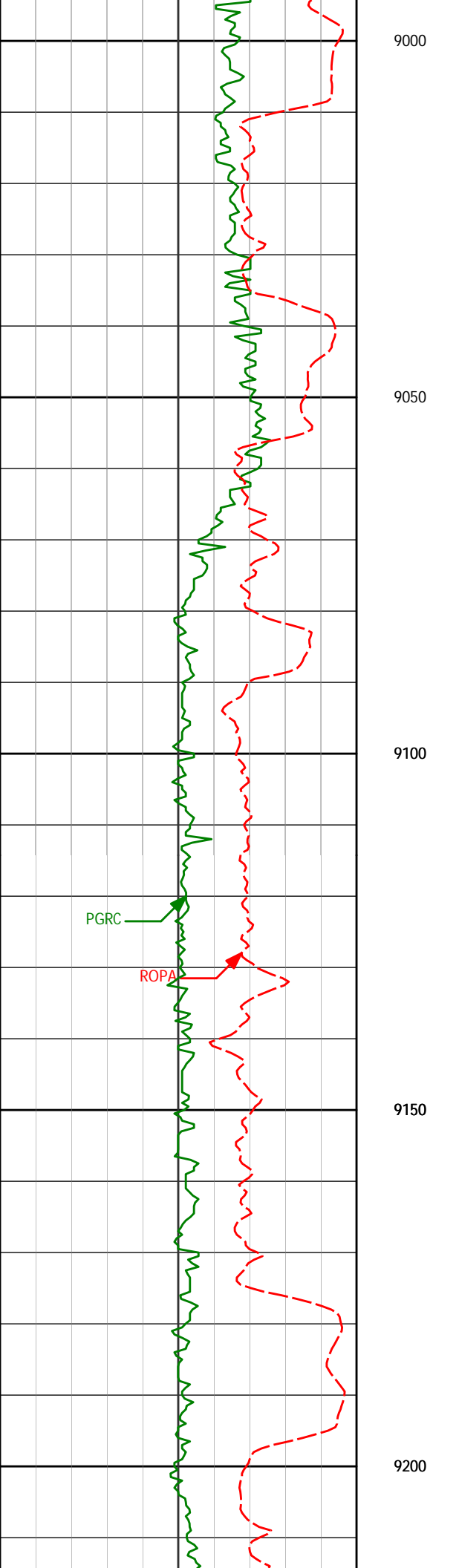
91.73°

90.60°

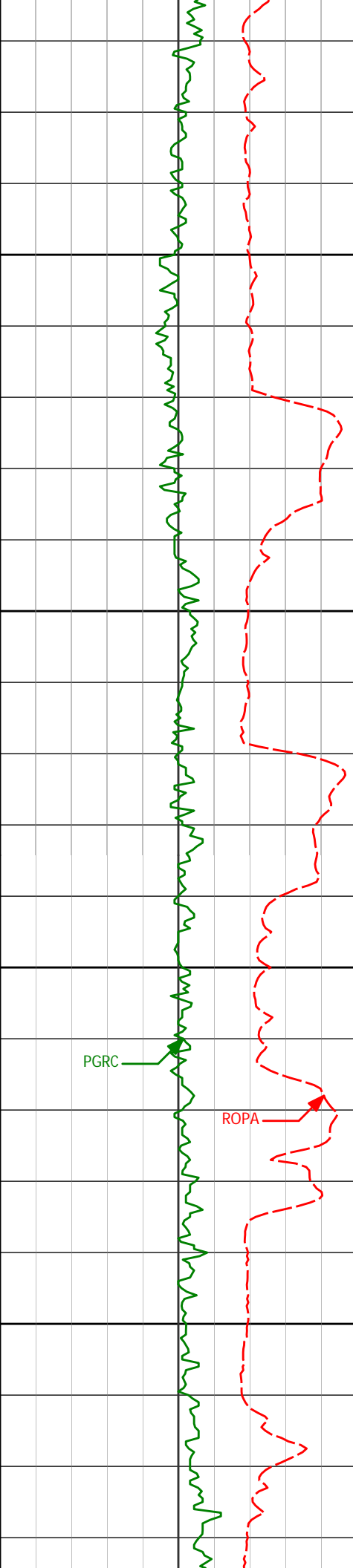
6795.91'

2338.35'

8950



Coordinate	Value
9000	
9025'	90.59°
	91.03°
	6793.99'
	2429.37'
9050	
9100	
9120'	90.37°
	90.05°
	6793.20'
	2520.53'
9150	
9200	



9250

9300

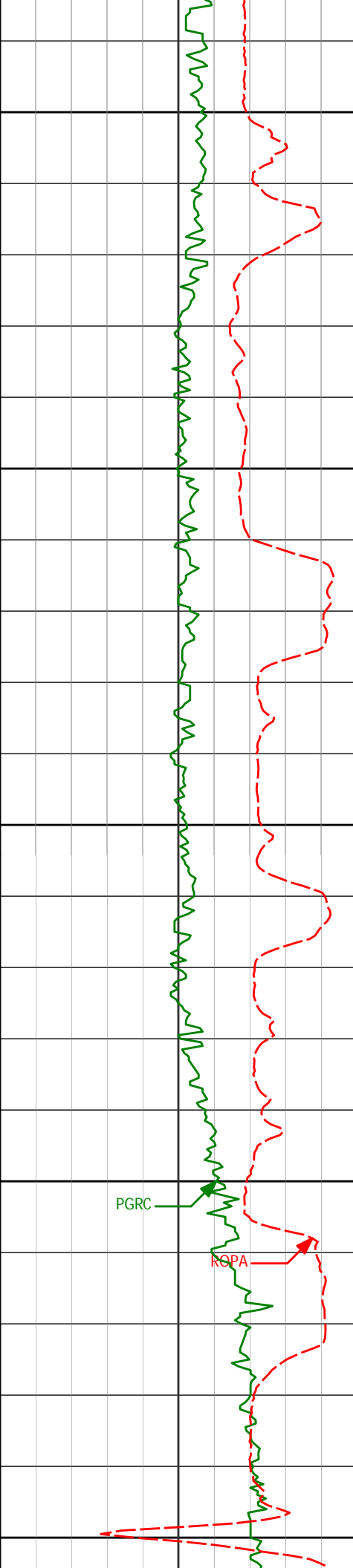
9350

9400

PGRC

ROPA

9215'	88.95°	88.81°	6793.76'	2612.18'
9310'	92.56°	89.94°	6792.51'	2703.85'
9404'	89.11°	89.13°	6791.15'	2794.48'



9450

9500

9550

9600

9650

9499'

91.75°

89.68°

6790.44'

2886.14'

9594'

91.54°

89.20°

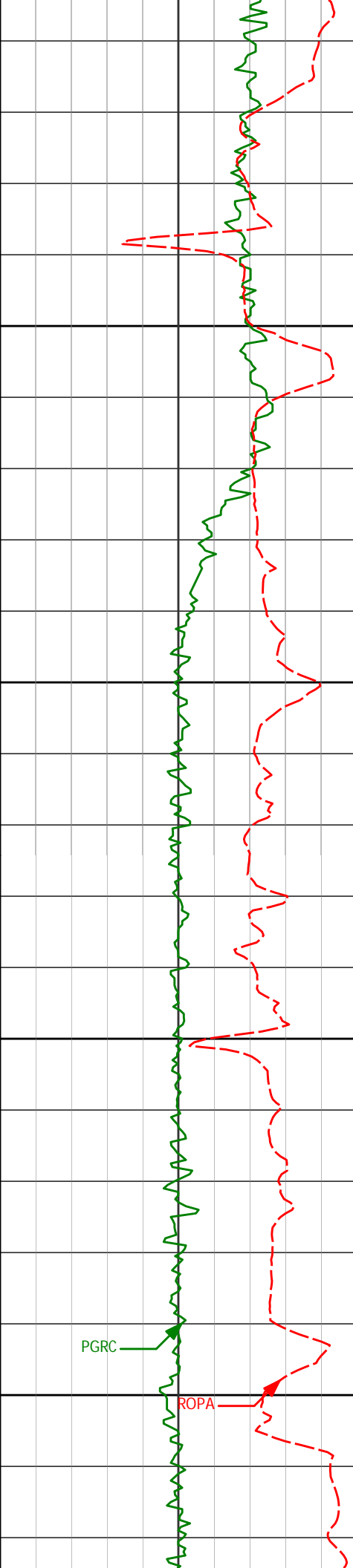
6787.71'

2977.76'

PGRC

ROPA





9689'

89.42°

88.69°

6786.91'

3069.62'

9700

9750

9784'

90.62°

87.43°

6786.89'

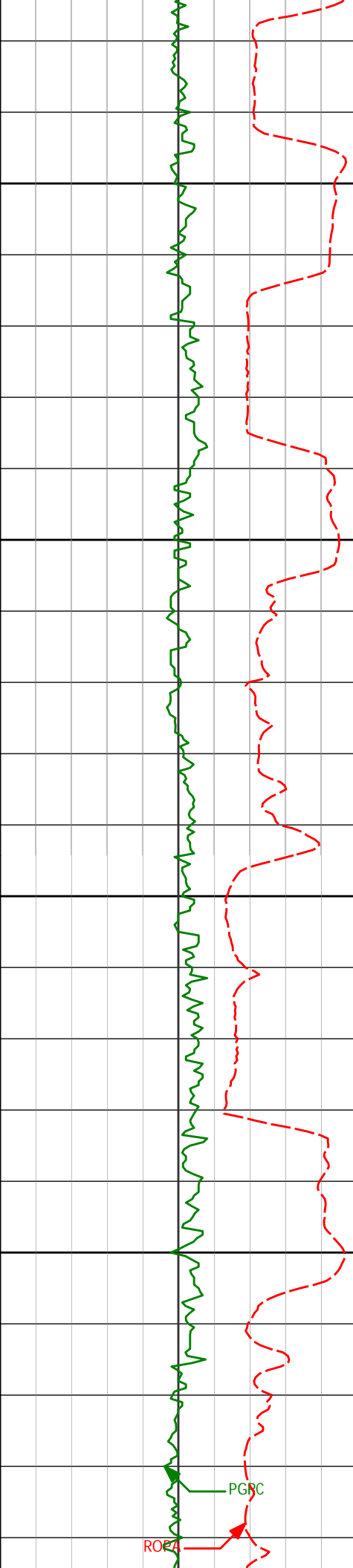
3161.85'

9800

PGRC

ROPA

9850



9879'

88.98°

84.09°

6787.22'

3254.91'

9900

9950

9974'

89.26°

87.32°

6788.68'

3347.98'

10000

10050

10069'

91.02°

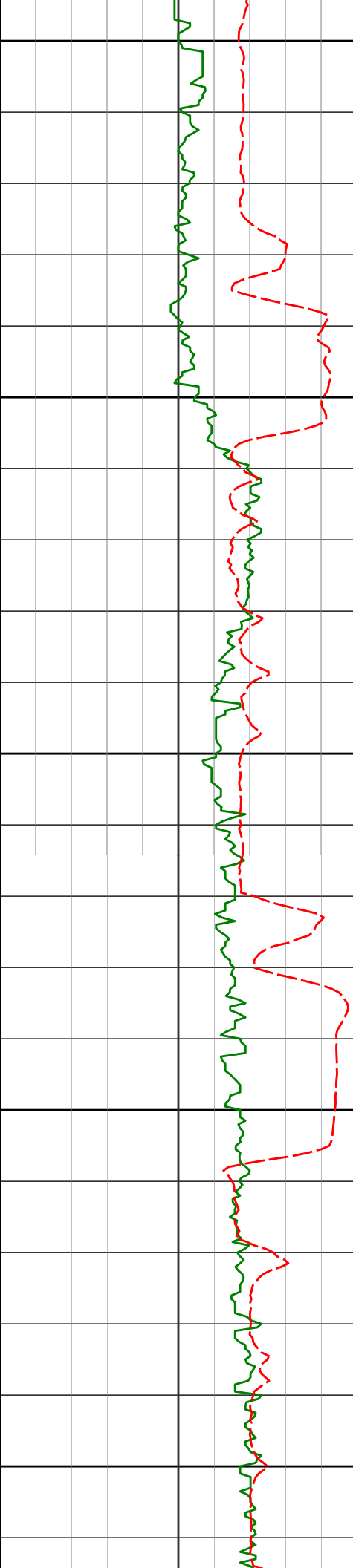
88.63°

6788.44'

3440.24'

PGBC

ROB



10100

10150

10200

10250

10300

10164'

92.13°

90.31°

6785.83'

3531.85'

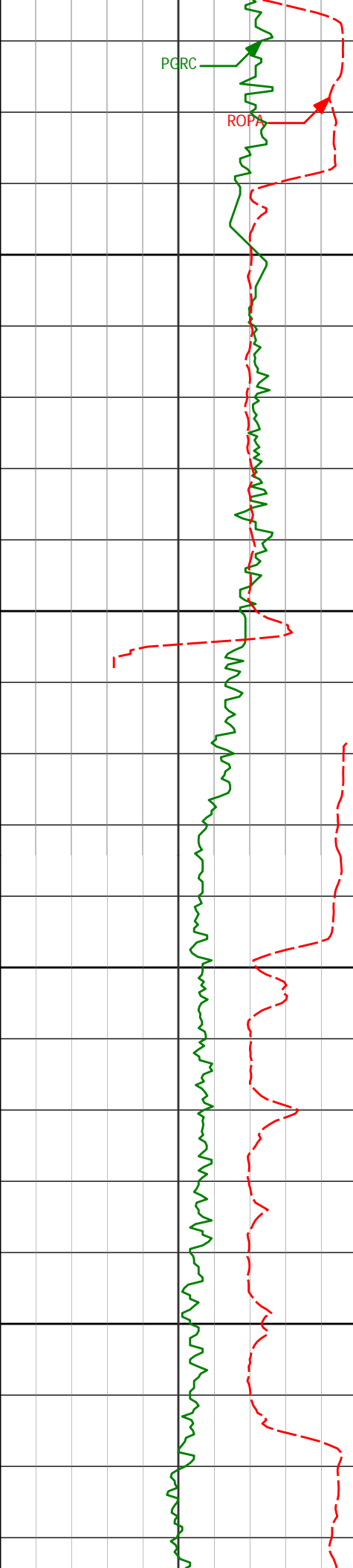
10258'

90.80°

90.05°

6783.43'

3622.18'



PGRC

ROPA

10350

10353'

91.11°

89.28°

6781.85'

3713.73'

10400

10450

10448'

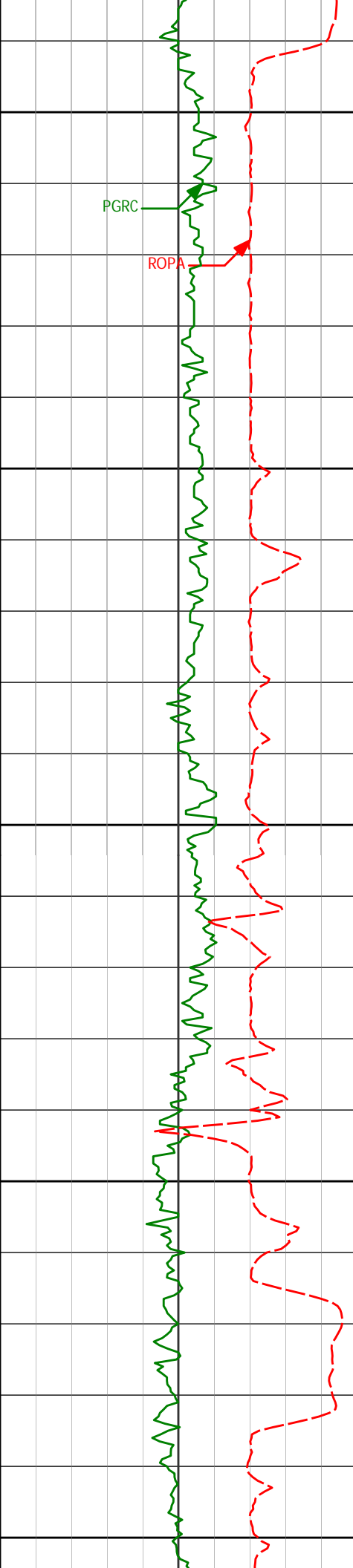
90.34°

89.41°

6780.64'

3805.42'

10500



10543' 89.91° 89.51° 6780.44' 3897.07'

10550

PGRC

ROPA

10600

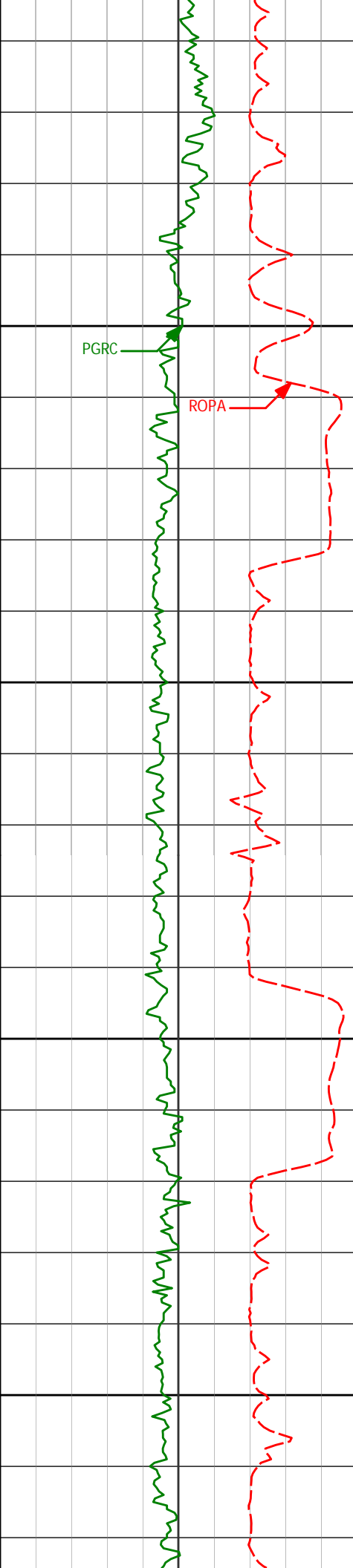
10638' 91.73° 89.06° 6779.09' 3988.79'

10650

10700

10733' 92.31° 87.66° 6775.74' 4080.84'

10750



10800

PGRC

ROPA

10828'

91.11°

86.37°

6772.90'

4173.43'

10850

10900

10923'

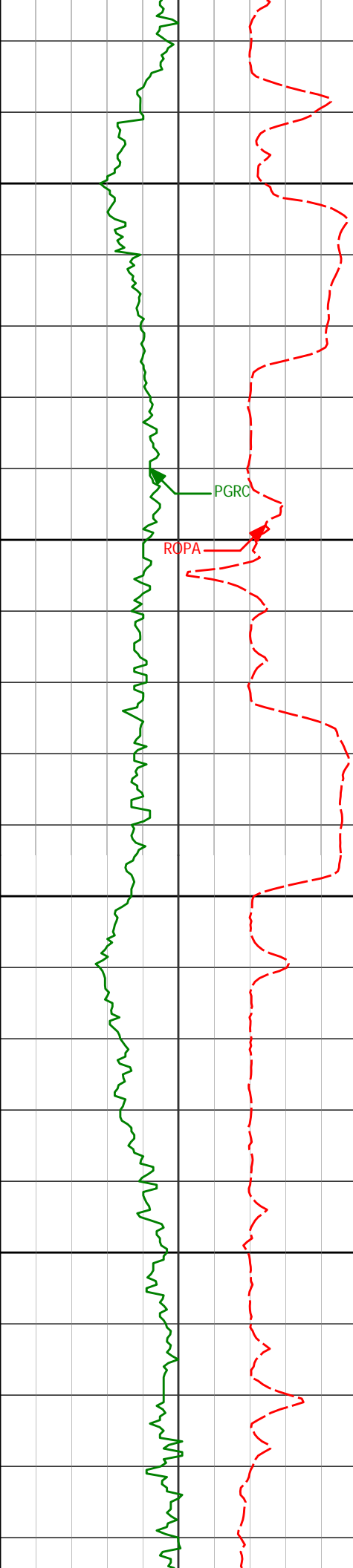
89.63°

85.88°

6772.29'

4266.37'

10950



11000

11018'

91.48°

88.33°

6771.37'

4358.96'

PGRC

ROPA

11050

11100

11113'

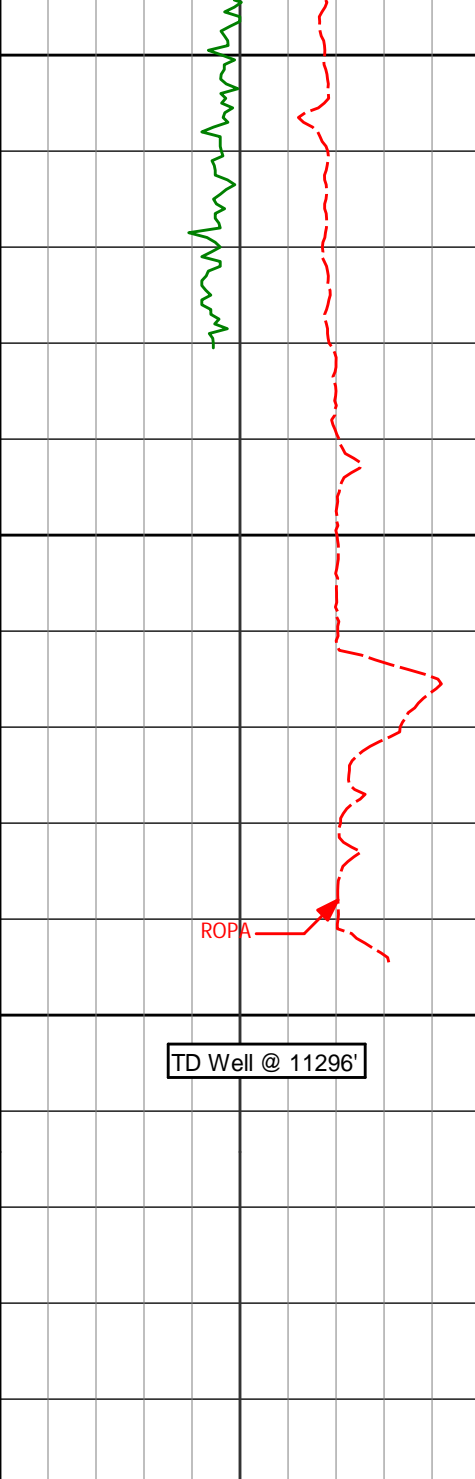
89.57°

89.33°

6770.50'

4450.87'

11150



11200

11208' 91.66° 88.17° 6769.47' 4542.81'

11235' 90.28° 86.47° 6769.02' 4569.10'

11250

11296' 90.28° 86.47° 6768.72' 4628.70'

11300

TD Well @ 11296'

ROP Average

ROPA

feet per hr

PCG Gamma Ray

PGRC

api

Depth
ft

Depth

Inc.

Azi.

TVD

V.S.

1K

0

0

300



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble
Wells Ranch AE08-69-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0009759227

794.00	0.00	0.00	794.00	0.00 N	0.00 E	0.00	TIE-IN
831.00	0.50	209.66	831.00	0.14 S	0.08 W	-0.11	1.35
987.00	1.03	257.17	986.99	1.04 S	1.78 W	-1.99	0.50
1079.00	3.10	336.86	1078.93	1.07 N	3.56 W	-3.13	3.36
1171.00	5.18	330.37	1170.69	6.97 N	6.59 W	-4.44	2.31
1264.00	6.33	342.44	1263.22	15.51 N	10.21 W	-5.61	1.79
1356.00	8.71	355.52	1354.43	27.29 N	12.29 W	-4.39	3.17
1448.00	10.34	352.90	1445.16	42.43 N	13.85 W	-1.78	1.84
1543.00	14.21	357.98	1537.97	62.56 N	15.32 W	2.29	4.22
1637.00	17.68	358.28	1628.34	88.36 N	16.15 W	8.52	3.69
1732.00	17.08	358.76	1719.01	116.72 N	16.89 W	15.53	0.65
1827.00	17.42	354.71	1809.74	144.82 N	18.50 W	21.63	1.31
1922.00	17.64	346.71	1900.34	173.00 N	23.12 W	24.86	2.55
2017.00	17.36	345.04	1990.94	200.70 N	30.09 W	25.69	0.61
2112.00	18.27	346.36	2081.39	228.87 N	37.26 W	26.47	1.04
2207.00	18.59	347.46	2171.52	258.12 N	44.06 W	27.89	0.50
2302.00	17.78	347.24	2261.77	287.05 N	50.55 W	29.52	0.85
2397.00	17.92	351.72	2352.20	315.66 N	55.85 W	32.20	1.45
2492.00	18.25	352.99	2442.50	344.89 N	59.78 W	36.39	0.54
2586.00	19.02	349.44	2531.58	374.57 N	64.38 W	40.04	1.46
2681.00	17.38	349.51	2621.82	403.74 N	69.80 W	42.76	1.73
2776.00	18.33	347.18	2712.25	432.25 N	75.70 W	44.85	1.25
2871.00	18.40	347.19	2802.41	461.44 N	82.34 W	46.41	0.07
2966.00	18.68	350.51	2892.48	491.06 N	88.17 W	48.86	1.15
3061.00	18.01	353.30	2982.65	520.66 N	92.40 W	52.86	1.16
3156.00	17.22	353.59	3073.20	549.23 N	95.68 W	57.48	0.84
3251.00	17.34	352.81	3163.91	577.25 N	99.02 W	61.89	0.27
3346.00	17.95	349.68	3254.44	605.69 N	103.41 W	65.41	1.19
3441.00	17.03	349.16	3345.05	633.76 N	108.65 W	68.02	0.98
3535.00	17.55	349.11	3434.80	661.20 N	113.92 W	70.42	0.55
3630.00	18.34	347.69	3525.18	689.86 N	119.81 W	72.55	0.95
3725.00	17.62	348.17	3615.54	718.54 N	125.94 W	74.46	0.78
3820.00	18.23	348.29	3705.93	747.16 N	131.91 W	76.51	0.65
3915.00	19.49	348.95	3795.82	777.27 N	137.97 W	78.88	1.34
4010.00	19.63	348.57	3885.34	808.46 N	144.17 W	81.41	0.20
4105.00	18.18	348.25	3975.22	838.61 N	150.35 W	83.67	1.53
4199.00	18.29	348.59	4064.50	867.42 N	156.25 W	85.84	0.16
4294.00	17.54	348.59	4154.89	896.07 N	162.03 W	88.07	0.79
4389.00	16.83	347.99	4245.65	923.55 N	167.72 W	90.08	0.77
4484.00	17.02	349.21	4336.53	950.66 N	173.19 W	92.20	0.43
4579.00	15.32	347.58	4427.77	976.58 N	178.49 W	94.16	1.85
4674.00	13.31	349.02	4519.82	999.58 N	183.27 W	95.82	2.16
4769.00	12.60	349.49	4612.40	1020.50 N	187.24 W	97.69	0.75
4864.00	11.59	350.46	4705.29	1040.10 N	190.71 W	99.69	1.09
4958.00	10.06	354.37	4797.62	1057.58 N	193.08 W	102.17	1.80
5053.00	8.98	356.82	4891.31	1073.24 N	194.31 W	105.26	1.22
5148.00	7.88	355.35	4985.28	1087.13 N	195.25 W	108.14	1.17
5243.00	6.42	344.99	5079.54	1098.76 N	197.15 W	109.47	2.04
5338.00	4.89	340.40	5174.08	1107.71 N	199.89 W	109.27	1.68
5433.00	2.82	329.42	5268.86	1113.54 N	202.43 W	108.41	2.31
5528.00	0.69	284.07	5363.81	1115.69 N	204.18 W	107.31	2.50
5812.00	0.15	45.62	5647.80	1116.37 N	205.58 W	106.16	0.28
6097.00	0.66	163.96	5932.80	1115.06 N	204.85 W	106.50	0.26
6135.00	0.51	171.90	5970.79	1114.69 N	204.77 W	106.48	0.46
6189.00	1.09	173.30	6024.79	1113.94 N	204.67 W	106.36	1.08
6284.00	4.94	76.31	6119.67	1114.01 N	200.59 W	110.31	5.46
6332.00	9.18	72.52	6167.29	1115.65 N	194.92 W	116.21	8.87
6378.00	13.23	72.07	6212.41	1118.38 N	186.41 W	125.14	8.82
6426.00	17.26	77.08	6258.71	1121.66 N	174.24 W	137.75	8.81
6473.00	20.61	83.50	6303.17	1124.16 N	159.22 W	152.88	8.38
6521.00	24.15	86.43	6347.54	1125.73 N	141.02 W	170.82	7.74
6568.00	27.72	86.55	6389.80	1126.98 N	120.50 W	190.91	7.59
6616.00	31.58	86.51	6431.51	1128.42 N	96.81 W	214.10	8.03
6663.00	35.44	88.43	6470.69	1129.54 N	70.89 W	239.34	8.53
6711.00	40.01	90.22	6508.65	1129.86 N	41.54 W	267.67	9.78
6758.00	44.55	90.00	6543.42	1129.80 N	9.93 W	298.07	9.67
6806.00	47.58	90.33	6576.72	1129.70 N	24.63 E	331.30	6.33
6853.00	48.90	90.80	6608.02	1129.35 N	59.69 E	364.93	2.92
6901.00	51.42	88.96	6638.77	1129.44 N	96.54 E	400.42	6.02
6948.00	55.19	86.40	6666.85	1130.98 N	134.18 E	437.06	9.13

6996.00	58.95	86.66	6692.94	1133.42 N	174.39 E	476.41	7.84
7043.00	62.56	87.73	6715.90	1135.42 N	215.35 E	516.36	7.93
7091.00	67.68	89.11	6736.09	1136.61 N	258.86 E	558.55	10.98
7138.00	72.80	89.96	6751.97	1136.96 N	303.07 E	601.20	11.02
7186.00	75.54	89.54	6765.07	1137.17 N	349.25 E	645.68	5.77
7232.00	78.73	88.72	6775.31	1137.85 N	394.08 E	689.01	7.15
7272.00	81.60	88.49	6782.14	1138.81 N	433.48 E	727.18	7.20
7332.00	84.76	88.04	6789.27	1140.61 N	493.02 E	784.96	5.33
7412.00	84.87	87.10	6796.49	1143.99 N	572.62 E	862.47	1.18
7507.00	86.95	88.77	6803.27	1147.40 N	667.31 E	954.51	2.79
7602.00	90.06	89.07	6805.75	1149.19 N	762.25 E	1046.35	3.30
7696.00	92.71	89.61	6803.48	1150.27 N	856.20 E	1137.05	2.87
7791.00	91.63	87.95	6799.88	1152.30 N	951.11 E	1228.92	2.08
7886.00	90.15	88.32	6798.40	1155.39 N	1046.04 E	1321.11	1.60
7981.00	90.03	87.94	6798.24	1158.48 N	1140.99 E	1413.32	0.42
8076.00	91.26	89.09	6797.17	1160.94 N	1235.95 E	1505.36	1.77
8171.00	91.20	89.31	6795.13	1162.27 N	1330.92 E	1597.10	0.24
8266.00	87.57	86.51	6796.15	1165.74 N	1425.83 E	1689.36	4.82
8361.00	90.40	86.51	6797.83	1171.52 N	1520.63 E	1782.16	2.98
8456.00	89.88	88.15	6797.60	1175.94 N	1615.52 E	1874.67	1.81
8551.00	89.14	86.25	6798.42	1180.58 N	1710.40 E	1967.22	2.15
8645.00	90.31	85.73	6798.88	1187.16 N	1804.16 E	2059.24	1.36
8740.00	90.18	84.81	6798.47	1194.99 N	1898.84 E	2152.47	0.97
8835.00	90.59	84.21	6797.83	1204.07 N	1993.40 E	2245.93	0.76
8930.00	91.73	90.60	6795.91	1208.37 N	2088.23 E	2338.35	6.83
9025.00	90.59	91.03	6793.99	1207.02 N	2183.20 E	2429.37	1.28
9120.00	90.37	90.05	6793.20	1206.13 N	2278.19 E	2520.53	1.05
9215.00	88.95	88.81	6793.76	1207.08 N	2373.18 E	2612.18	1.98
9310.00	92.56	89.94	6792.51	1208.12 N	2468.15 E	2703.85	3.98
9404.00	89.11	89.13	6791.15	1208.89 N	2562.12 E	2794.48	3.77
9499.00	91.75	89.68	6790.44	1209.88 N	2657.11 E	2886.14	2.85
9594.00	91.54	89.20	6787.71	1210.80 N	2752.06 E	2977.76	0.55
9689.00	89.42	88.69	6786.91	1212.55 N	2847.04 E	3069.62	2.30
9784.00	90.62	87.43	6786.89	1215.76 N	2941.98 E	3161.85	1.84
9879.00	88.98	84.09	6787.22	1222.79 N	3036.70 E	3254.91	3.91
9974.00	89.26	87.32	6788.68	1229.90 N	3131.41 E	3347.98	3.41
10069.00	91.02	88.63	6788.44	1233.25 N	3226.35 E	3440.24	2.31
10164.00	92.13	90.31	6785.83	1234.13 N	3321.30 E	3531.85	2.11
10258.00	90.80	90.05	6783.43	1233.83 N	3415.27 E	3622.18	1.44
10353.00	91.11	89.28	6781.85	1234.39 N	3510.25 E	3713.73	0.88
10448.00	90.34	89.41	6780.64	1235.48 N	3605.24 E	3805.42	0.82
10543.00	89.91	89.51	6780.44	1236.37 N	3700.23 E	3897.07	0.47
10638.00	91.73	89.06	6779.09	1237.56 N	3795.21 E	3988.79	1.97
10733.00	92.31	87.66	6775.74	1240.28 N	3890.11 E	4080.84	1.59
10828.00	91.11	86.37	6772.90	1245.22 N	3984.94 E	4173.43	1.86
10923.00	89.63	85.88	6772.29	1251.64 N	4079.72 E	4266.37	1.64
11018.00	91.48	88.33	6771.37	1256.44 N	4174.58 E	4358.96	3.23
11113.00	89.57	89.33	6770.50	1258.38 N	4269.55 E	4450.87	2.27
11208.00	91.66	88.17	6769.47	1260.44 N	4364.51 E	4542.81	2.52
11235.00	90.28	86.47	6769.02	1261.70 N	4391.48 E	4569.10	8.13
11296.00	90.28	86.47	6768.72	1265.46 N	4452.36 E	4628.70	0.01

CALCULATION BASED ON MINIMUM CURVATURE METHOD

**SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT**

VERTICAL SECTION RELATIVE TO WELL HEAD

**VERTICAL SECTION IS COMPUTED ALONG A CLOSURE OF 74.13 DEGREES (GRID)
A TOTAL CORRECTION OF 7.79 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11296.00 FEET
IS 4628.71 FEET ALONG 74.13 DEGREES (GRID)**

Final survey projected to TD