

PCG Pressure Case Gamma
PCD Pressure Case Directional

Country : USA			
Field : Wattenberg			
Location : Lat: 40° 29' 19.25" North Long: 104° 24' 45.25" West			
Well : WR State USX AA16-66-1HNL			
Company : Noble Energy			
Rig : H&P 343		<div>Company : Noble Energy</div> <div>Rig : H&P 343</div> <div>Well : WR State USX AA16-66-1HNL</div> <div>Field : Wattenberg</div> <div>Country : USA</div> <div>API Number : 05-123-36041</div>	
LOCATION			
Latitude : 40° 29' 19.25" North Longitude : 104° 24' 45.25" West UTM Easting = 3,302,456.76 ft UTM Northing = 1,422,721.12 ft			
Permanent Datum : Ground Level		Elevation : 4777.00 ft	
Log Measured From : Drill Floor		24.00 ft Above Permanent Datum	
Drilling Measured From : Drill Floor		TVD LOG	
Depth Logged : 675.00 ft To 6,720.16 ft		Unit No. : 11610115	
Date Logged : 20-Nov-12 To 02-Dec-12		Job No. : CA-XX-0009860518	
Total Depth MD : 16,294.00 ft		Plot Type : Final	
Spud Date : 21-Nov-12		Plot Date : 02-Dec-12	
Run No.	Borehole Record (TVD)		Run No.
	Size	To	
2	8.750 in	675.00 ft	Size
	675.00 ft	5,868.37 ft	
3	8.750 in	5,868.37 ft	Size
	5,868.37 ft	6,646.78 ft	
	Casing Record (TVD)		To
	Size	Weight	
	9.625 in	36.00 lbpf	SURFACE
	7.000 in	26.00 lbpf	
	SURFACE		6,646.01 ft

Max Tool Temp (degF) / Source	150.10 / PCM	171.20 / PCM			
Rm @ Max Tool Temp (degF)	NA @ NA	NA @ NA			
Lead MWD Engineer	Gary Eifert	Gary Eifert			
Customer Representative	Johnny Sanchez	Johnny Sanchez			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.76	5.76			
Sub Serial Number	11331929	11331929			
Insert Serial Number	10744810	10744810			
Date and Time Initialized	20-Nov-12 20:24	20-Nov-12 20:24			
Date and Time Read	24-Nov-12 03:38	24-Nov-12 03:44			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	56.00	56.00			
Software Version	6.21	6.21			
Sub Serial Number	11331929	11331929			
Sonde Serial Number	11062085	11062085			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	75.02	326.84			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	48.65	48.48			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11331929	11331929			
Insert/Sonde Serial Number	11680977	11680977			

REMARKS

1. All depths are true vertical bit depths, referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annual velocities are calculated using the "Power Law" model for water based fluids and the "Bingham 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 (Corrected Gamma Ray):
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 7.4.01

WARRANTY

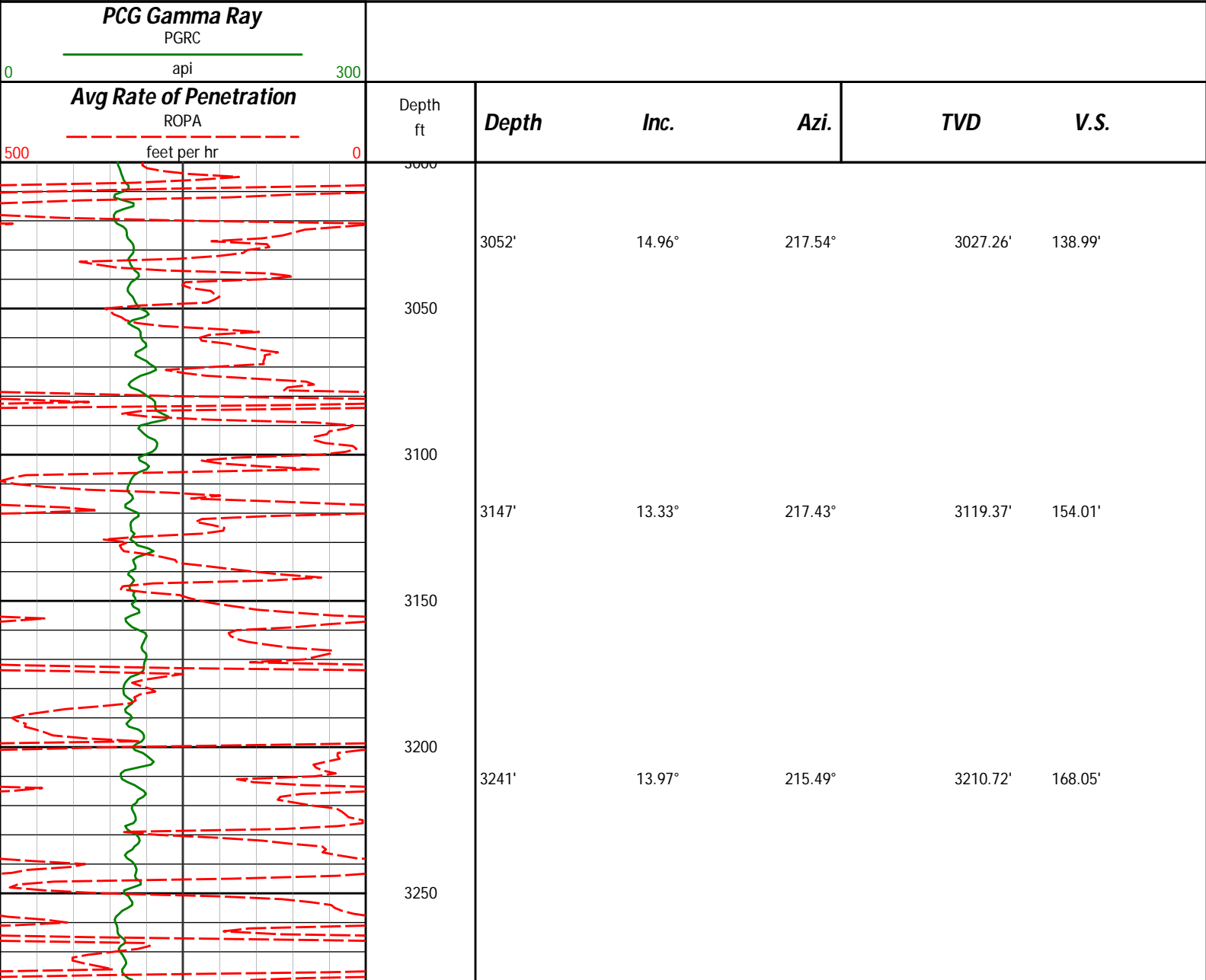
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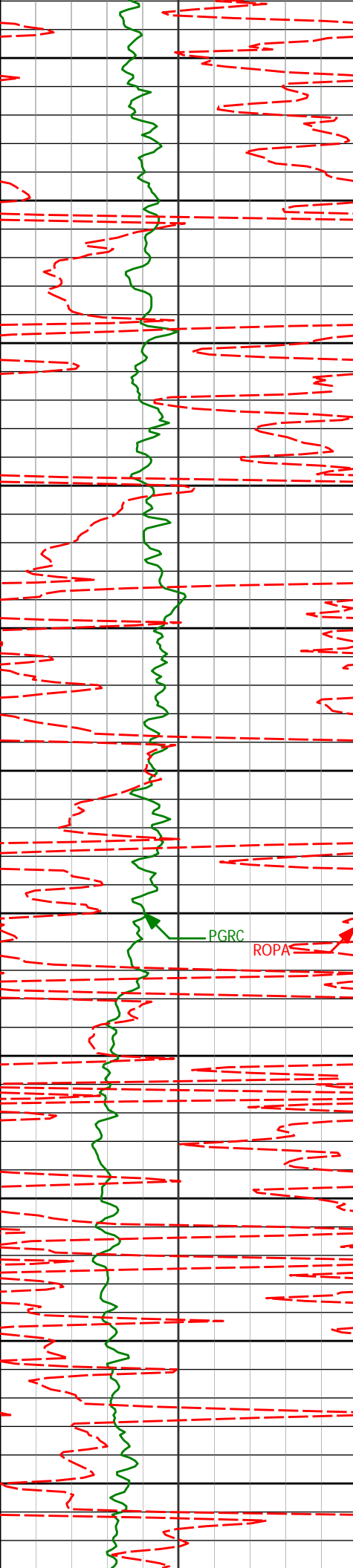
HALLIBURTON

Sperry Drilling Services

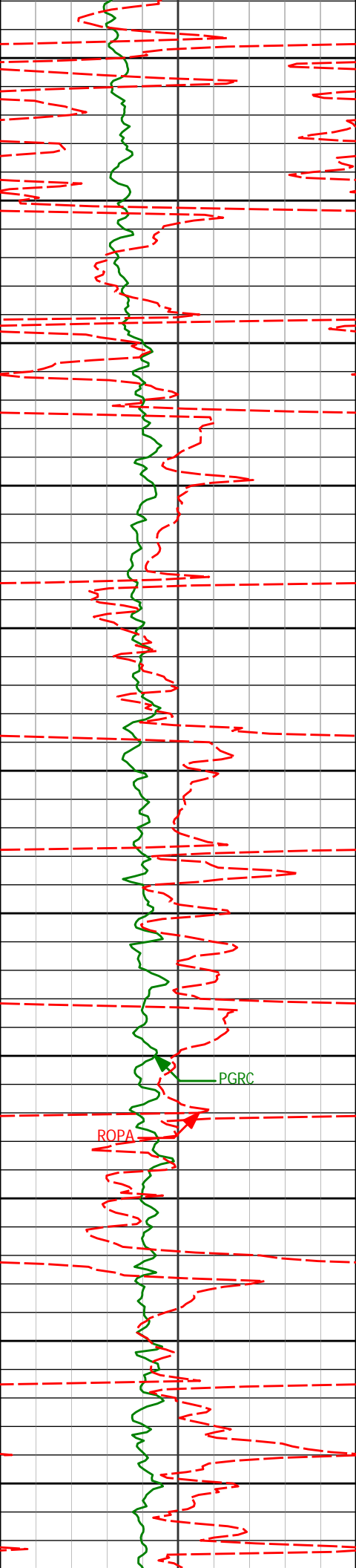
TVD Main Log 1:600

Noble Energy
Wells Ranch State USX AA16-66-1HNL
H&P 343
T6N-R63W

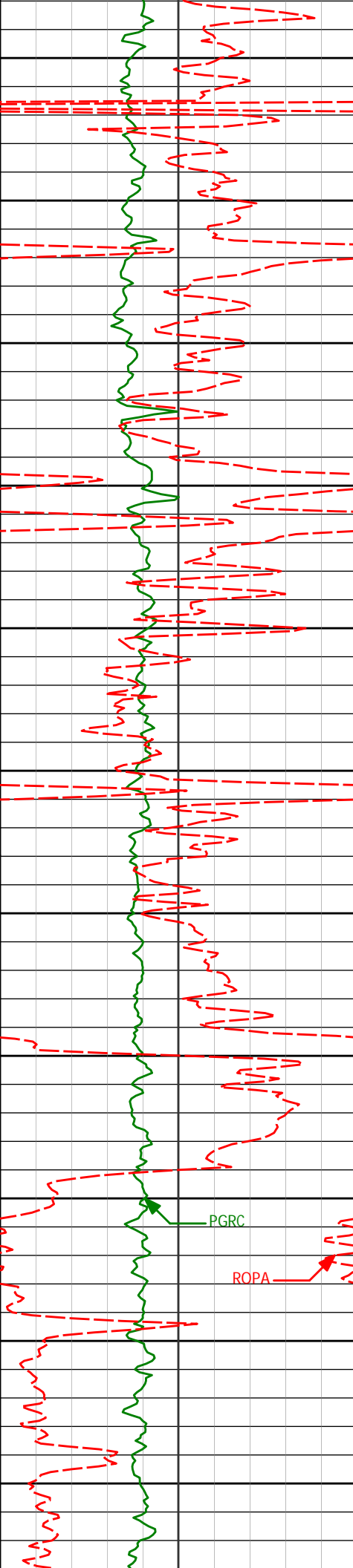




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3350					
3400	3430'	13.31°	217.41°	3394.66'	195.74'
3450					
3500	3525'	13.67°	217.54°	3487.03'	210.07'
3550					
3600	3618'	14.03°	221.08°	3577.33'	225.01'
3650					
3700	3713'	16.14°	219.66°	3669.05'	241.91'
3750	3807'	16.90°	217.92°	3759.17'	259.65'
3800					



3850	3902'	15.47°	219.49°	3850.41'	277.19'
3900					
3950	3996'	13.75°	218.17°	3941.36'	292.96'
4000					
4050	4090'	9.37°	218.31°	4033.44'	305.32'
4100					
4150	4185'	7.12°	218.13°	4127.45'	314.26'
4200					
4250	4280'	4.17°	223.27°	4221.98'	320.61'
4300					
4350	4374'	1.53°	197.44°	4315.86'	323.51'



4400

4469'

1.24°

189.45°

4410.83'

324.17'

4450

4500

4563'

1.25°

166.64°

4504.81'

324.19'

4550

4600

4657'

1.94°

137.99°

4598.77'

323.00'

4650

4700

4752'

2.74°

123.96°

4693.69'

320.16'

4750

4800

4846'

1.87°

118.50°

4787.62'

317.05'

4850

4900

4940'

1.52°

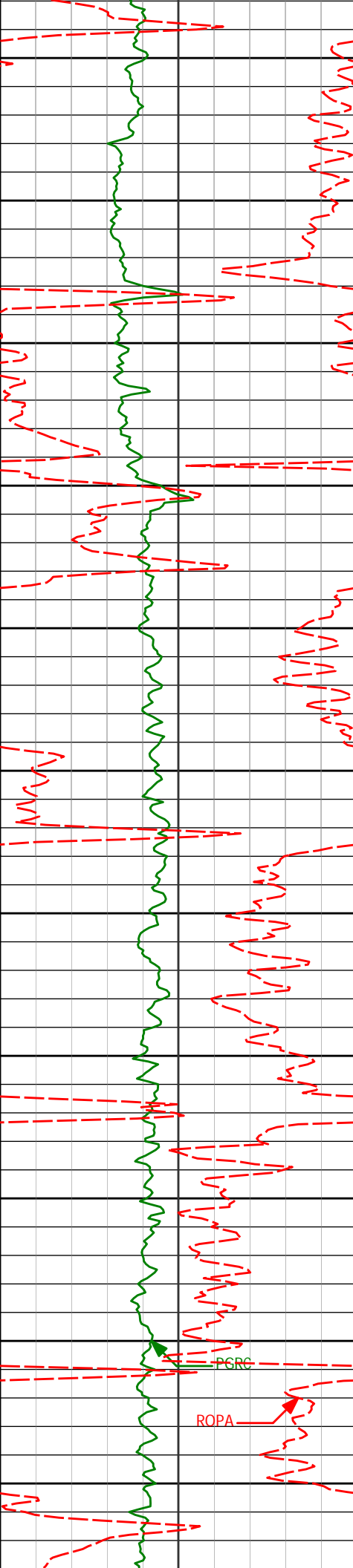
141.68°

4881.58'

315.01'

PGRC

ROPA



4950

5035'

1.96°

132.50°

4976.53'

313.14'

5000

5050

5129'

1.34°

127.88°

5070.49'

311.18'

5100

5150

5224'

0.99°

147.11°

5165.47'

309.92'

5200

5250

5319'

0.93°

148.88°

5260.46'

309.15'

5300

5350

5413'

1.07°

141.35°

5354.44'

308.27'

5400

PSRC

ROPA

5450

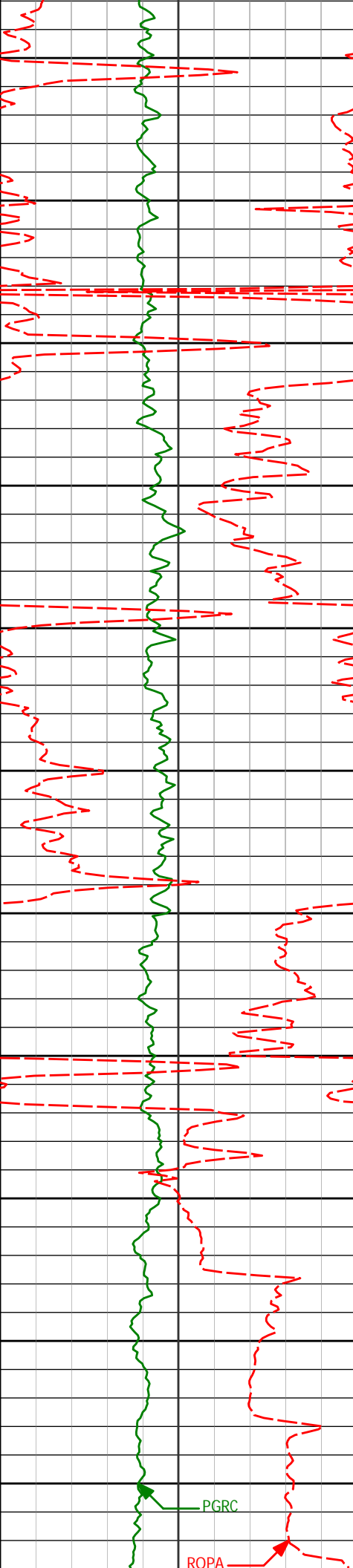
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136.17°

5448.43'

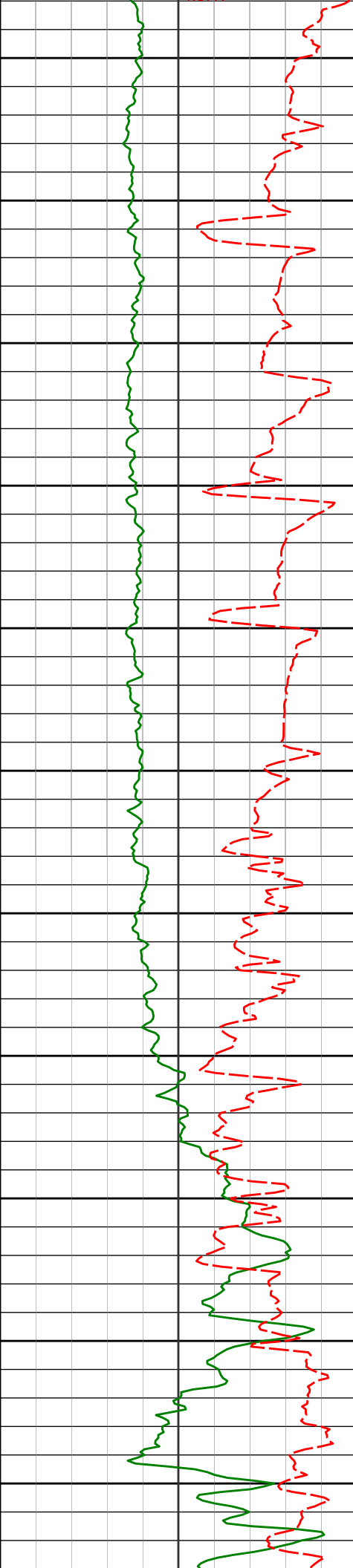
307.14'



5500				
5550	5602'	0.83°	116.32°	5543.41' 305.90'
5600				
5650	5696'	1.21°	115.50°	5637.40' 304.44'
5700				
5750	5791'	0.70°	108.43°	5732.38' 303.02'
5800				
5850	5888'	1.01°	91.16°	5829.37' 301.62'
<Run 200>				
5900				
5950	5983'	0.59°	31.17°	5924.37' 300.51'
6000	6030'	4.20°	289.66°	5971.32' 301.96'
	6077'	9.31°	275.00°	6017.99' 307.32'

PGRC

ROPA



6050

6124'

13.10°

266.97°

6064.08'

316.42'

6100

6172'

16.50°

266.10°

6110.48'

328.68'

6150

6219'

19.93°

265.75°

6155.12'

343.36'

6200

6266'

23.51°

265.72°

6198.78'

360.75'

6250

6313'

26.79°

268.96°

6241.32'

380.71'

6300

6361'

30.28°

272.63°

6283.49'

403.58'

6350

6408'

33.20°

276.41°

6323.46'

428.08'

6400

6455'

33.77°

273.15°

6362.66'

453.78'

6450

6502'

37.71°

269.07°

6400.81'

481.15'

6549'

43.14°

269.50°

6436.57'

511.60'

6596'

47.89°

269.02°

6469.50'

545.10'

6500

6644'

54.07°

269.30°

6499.70'

582.35'

6691'

59.25°

269.04°

6525.52'

621.58'

6550

6738'

60.84°

268.65°

6548.99'

662.28'

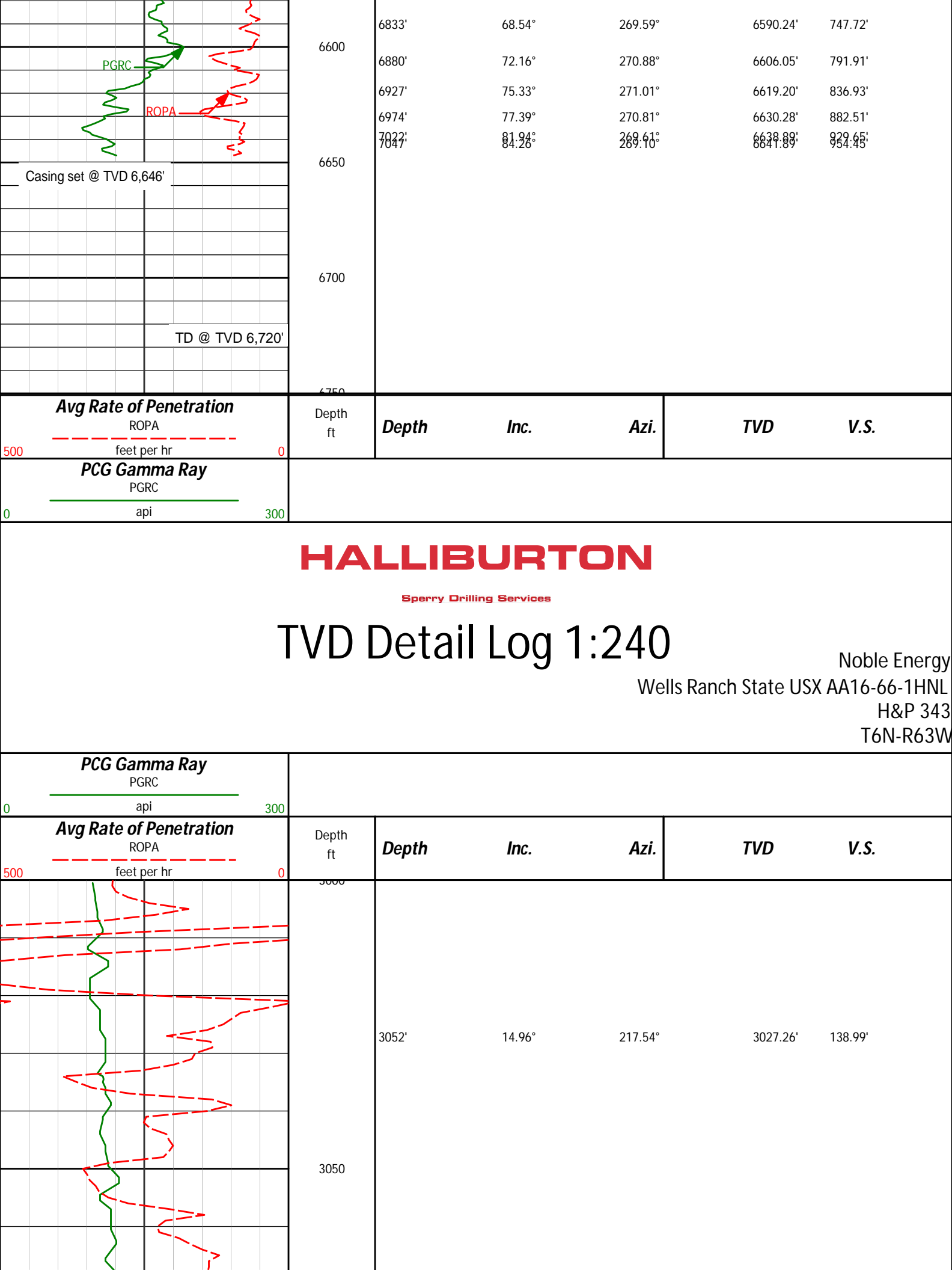
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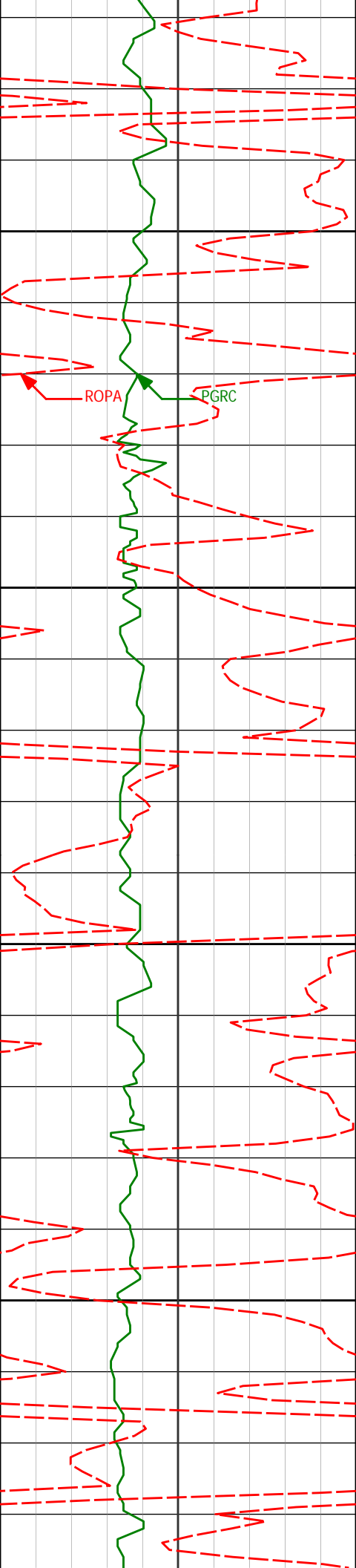
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269.27°

6570.84'

703.87'





3100

3147'

13.33°

217.43°

3119.37'

154.01'

3150

3200

3241'

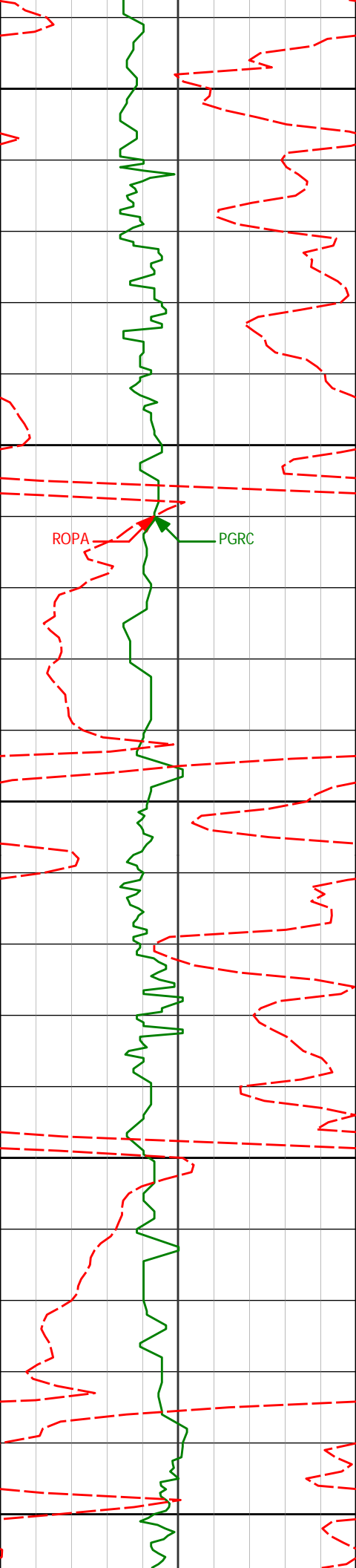
13.97°

215.49°

3210.72'

168.05'

3250



3300

3335'

12.93°

217.19°

3302.14'

181.84'

3350

3400

3450

3500

3430'

13.31°

217.41°

3394.66'

195.74'

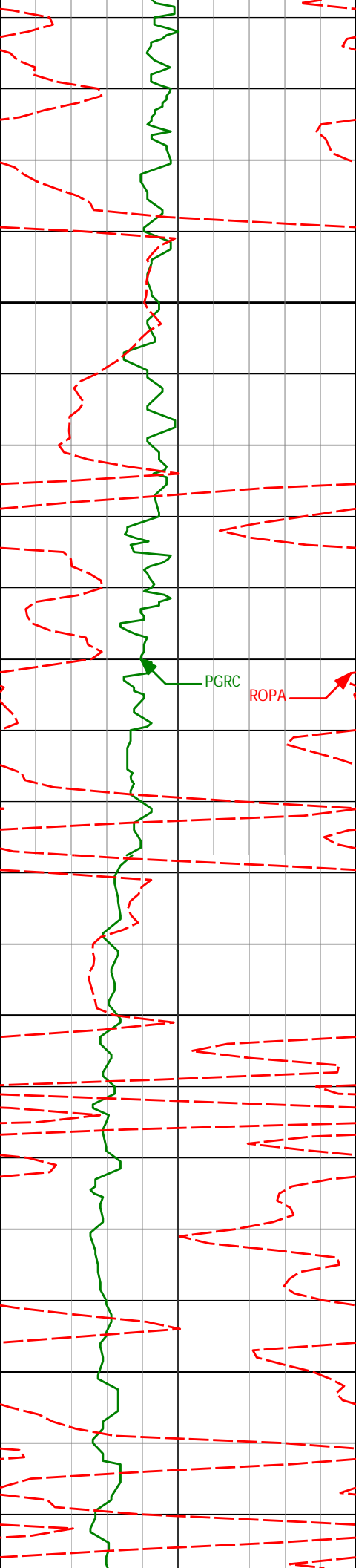
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217.54°

3487.03'

210.07'



3550

3600

3650

3700

3618'

14.03°

221.08°

3577.33'

225.01'

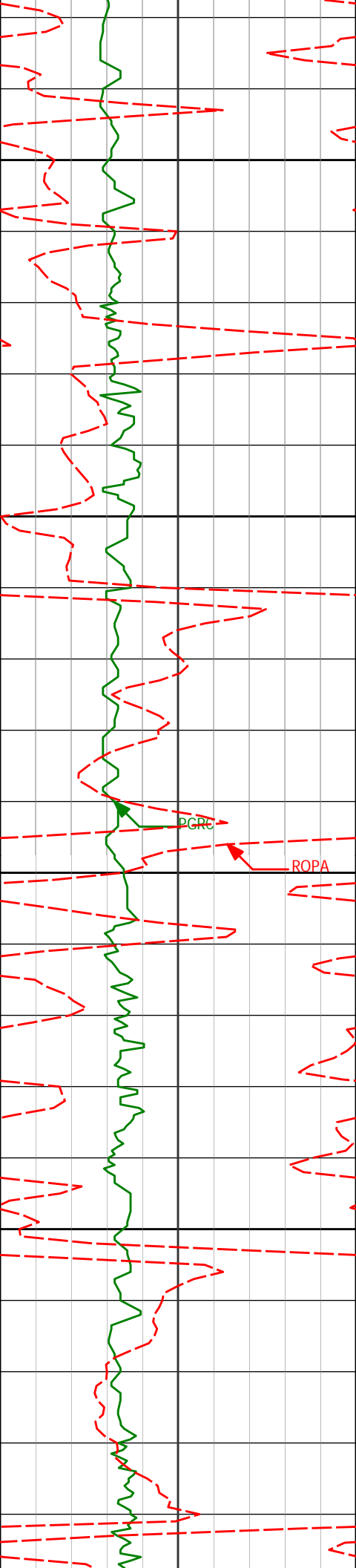
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16.14°

219.66°

3669.05'

241.91'



3750

3807'

16.90°

217.92°

3759.17'

259.65'

3800

3850

3902'

15.47°

219.49°

3850.41'

277.19'

3900

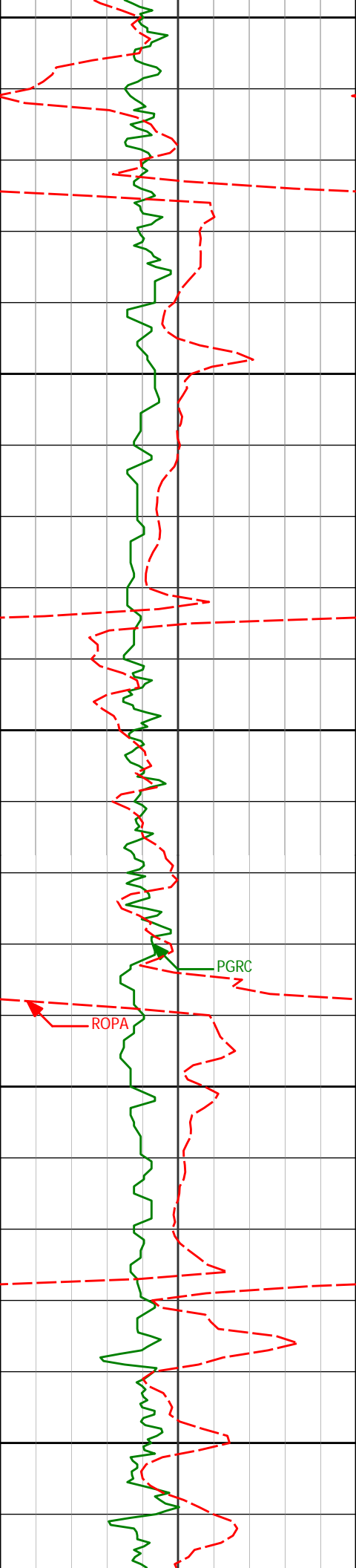
3996'

13.75°

218.17°

3941.36'

292.96'



3950

4000

4050

4100

4150

4090'

9.37°

218.31°

4033.44'

305.32'

4185'

7.12°

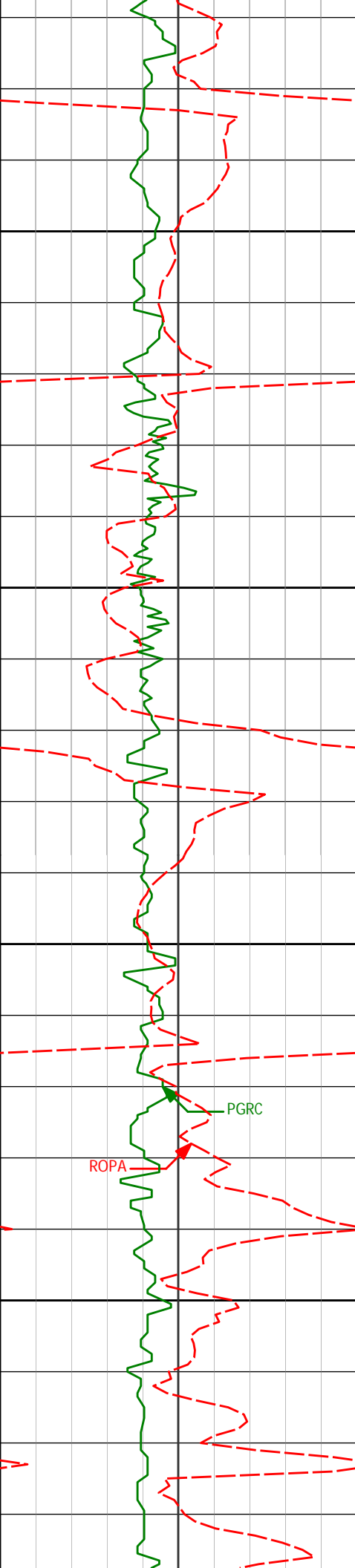
218.13°

4127.45'

314.26'

PGRC

ROPA



4200

4250

4300

4350

4280'

4.17°

223.27°

4221.98'

320.61'

4374'

1.53°

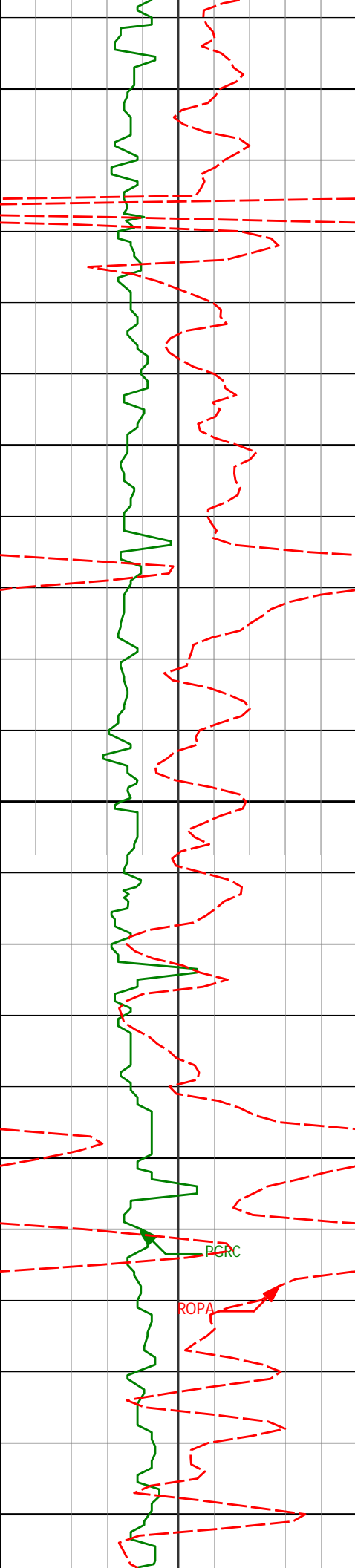
197.44°

4315.86'

323.51'

PGRC

ROPA



4400

4469'

1.24°

189.45°

4410.83'

324.17'

4450

4500

4563'

1.25°

166.64°

4504.81'

324.19'

4550

4600

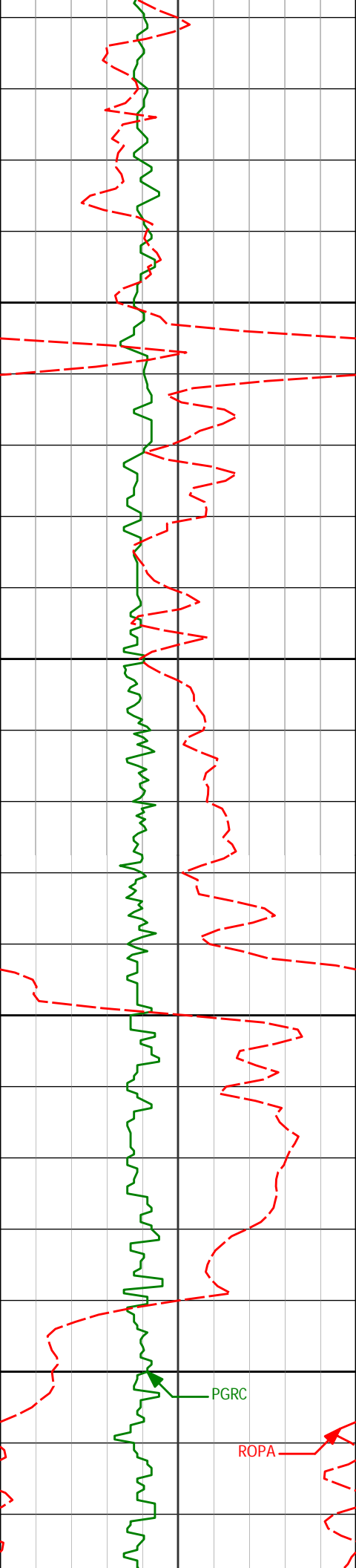
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1.94°

137.99°

4598.77'

323.00'



4650

4700

4750

4800

PGRC

ROPA

4752'

2.74°

123.96°

4693.69'

320.16'

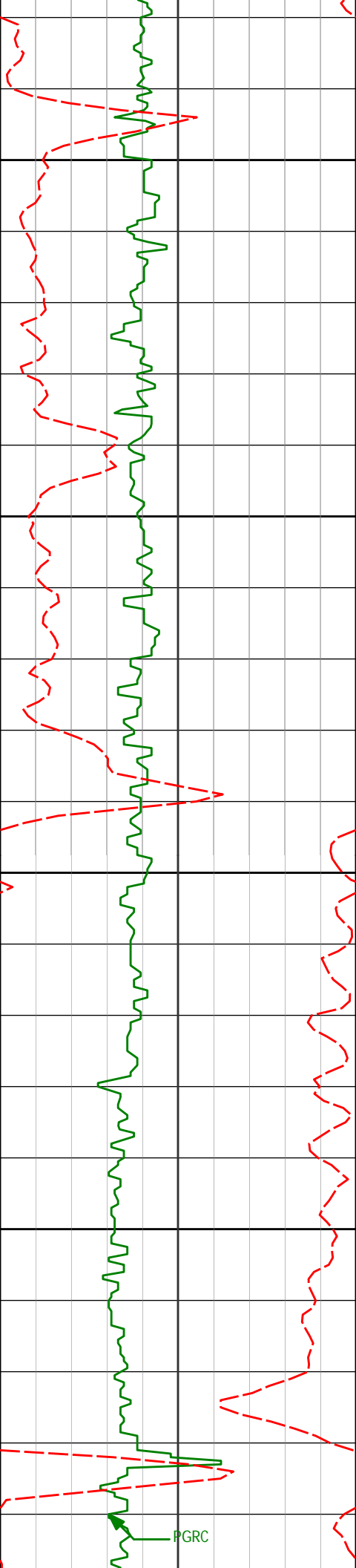
4846'

1.87°

118.50°

4787.62'

317.05'



4850

4940'

1.52°

141.68°

4881.58'

315.01'

4900

4950

5035'

1.96°

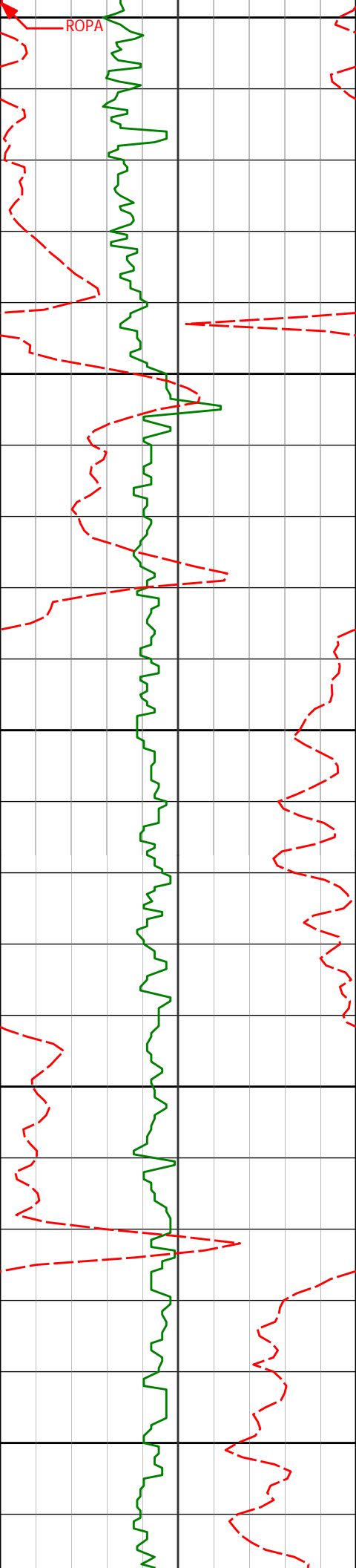
132.50°

4976.53'

313.14'

5000

PGRC



5050

5129'

1.34°

127.88°

5070.49'

311.18'

5100

5150

5224'

0.99°

147.11°

5165.47'

309.92'

5200

5250

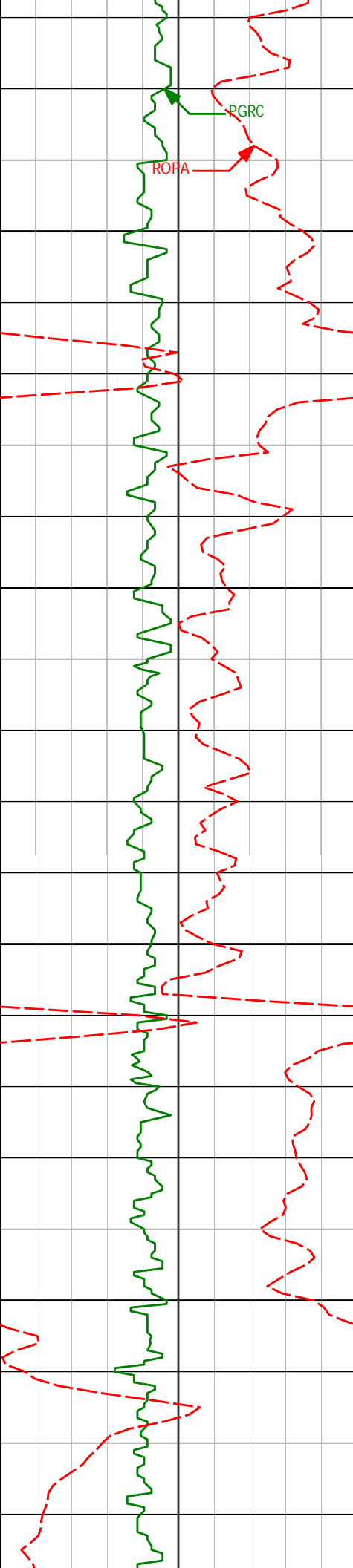
5319'

0.93°

148.88°

5260.46'

309.15'



PGRC

ROFA

5300

5350

5400

5450

5413'

1.07°

141.35°

5354.44'

308.27'

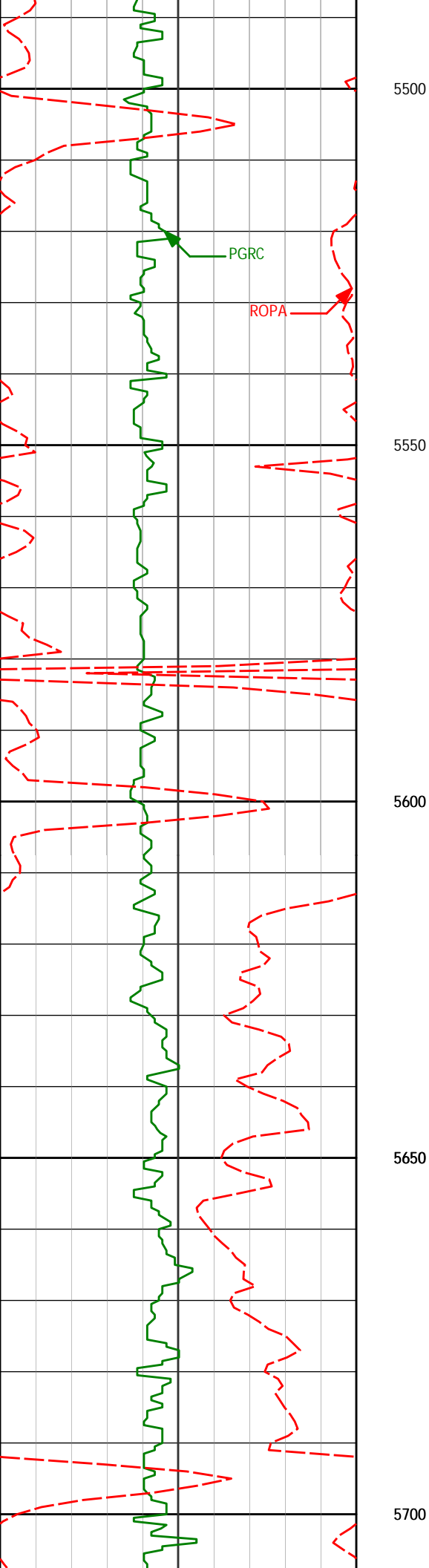
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136.17°

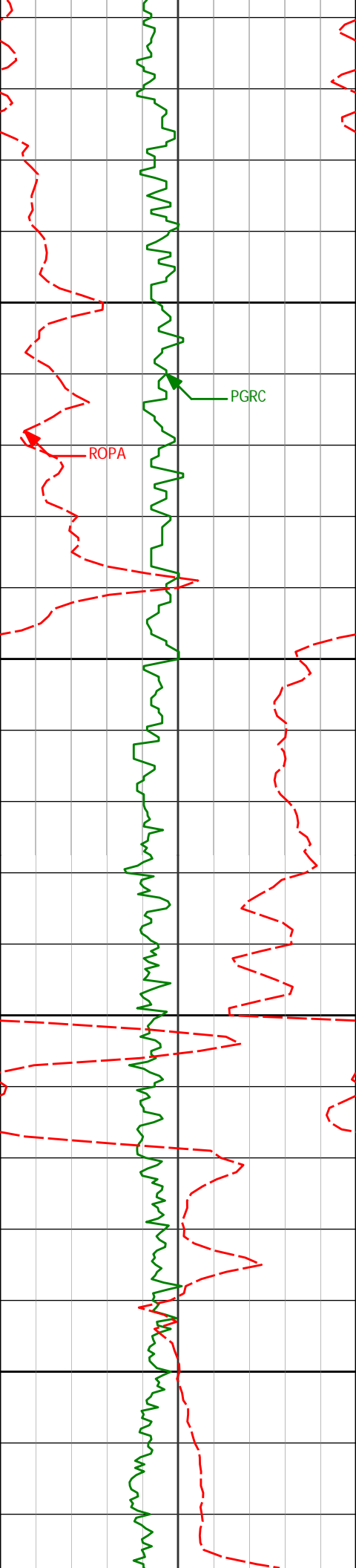
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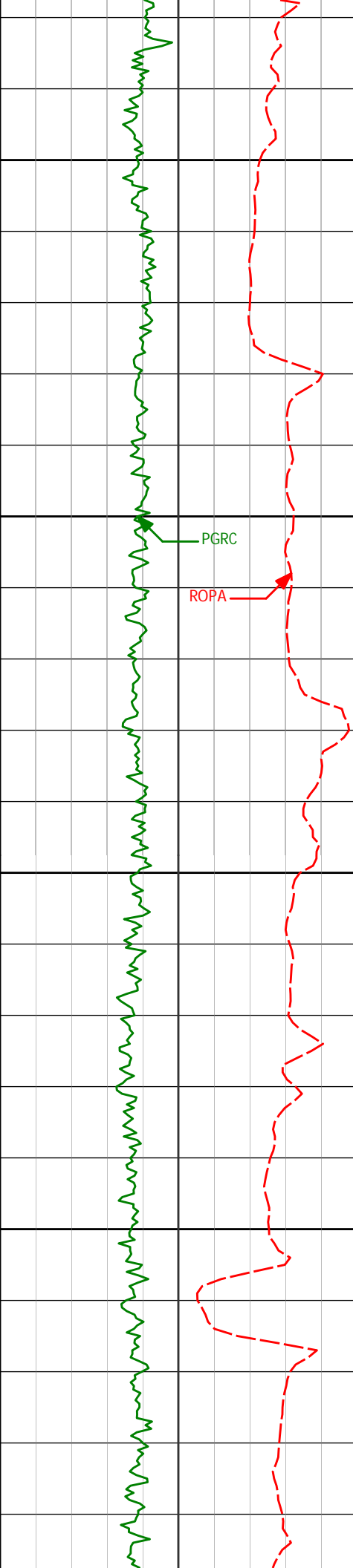


5602' 0.83° 116.32° 5543.41' 305.90'

5696' 1.21° 115.50° 5637.40' 304.44'



5791'	0.70°	108.43°	5732.38'	303.02'
5750				
5800				
5888'	1.01°	91.16°	5829.37'	301.62'
5850				
<Run 200>				
5900				
5983'	0.59°	31.17°	5924.37'	300.51'



5950

6030'

4.20°

289.66°

5971.32'

301.96'

6000

PGRC

ROPA

6077'

9.31°

275.00°

6017.99'

307.32'

6050

6124'

13.10°

266.97°

6064.08'

316.42'

6100

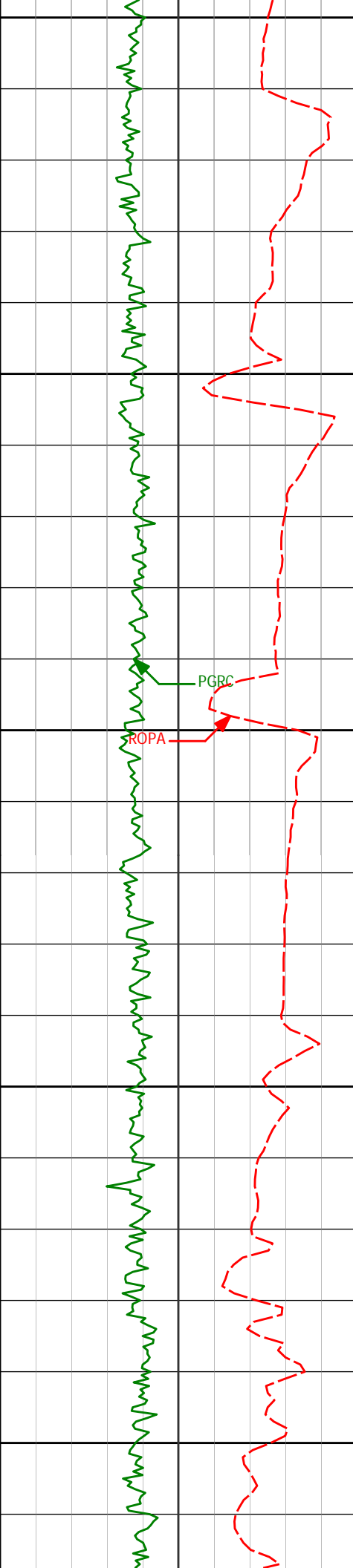
6172'

16.50°

266.10°

6110.48'

328.68'



6150

6219'

19.93°

265.75°

6155.12'

343.36'

6200

6266'

23.51°

265.72°

6198.78'

360.75'

6250

6313'

26.79°

268.96°

6241.32'

380.71'

6300

6361'

30.28°

272.63°

6283.49'

403.58'

6350

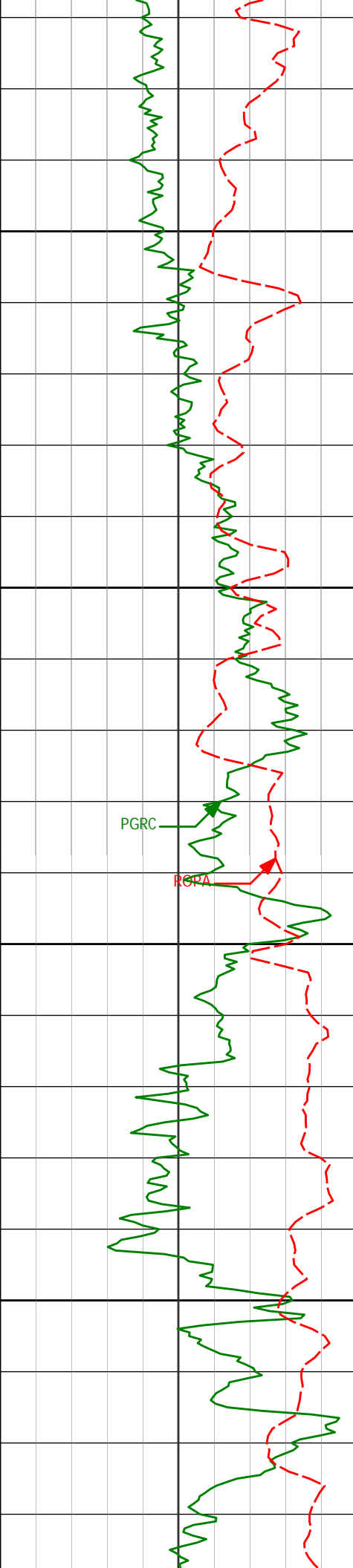
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273.15°

6362.66'

453.78'



6400

6502'

37.71°

269.07°

6400.81'

481.15'

6450

6549'

43.14°

269.50°

6436.57'

511.60'

6596'

47.89°

269.02°

6469.50'

545.10'

6500

6644'

54.07°

269.30°

6499.70'

582.35'

6691'

59.25°

269.04°

6525.52'

621.58'

6550

6738'

60.84°

268.65°

6548.99'

662.28'

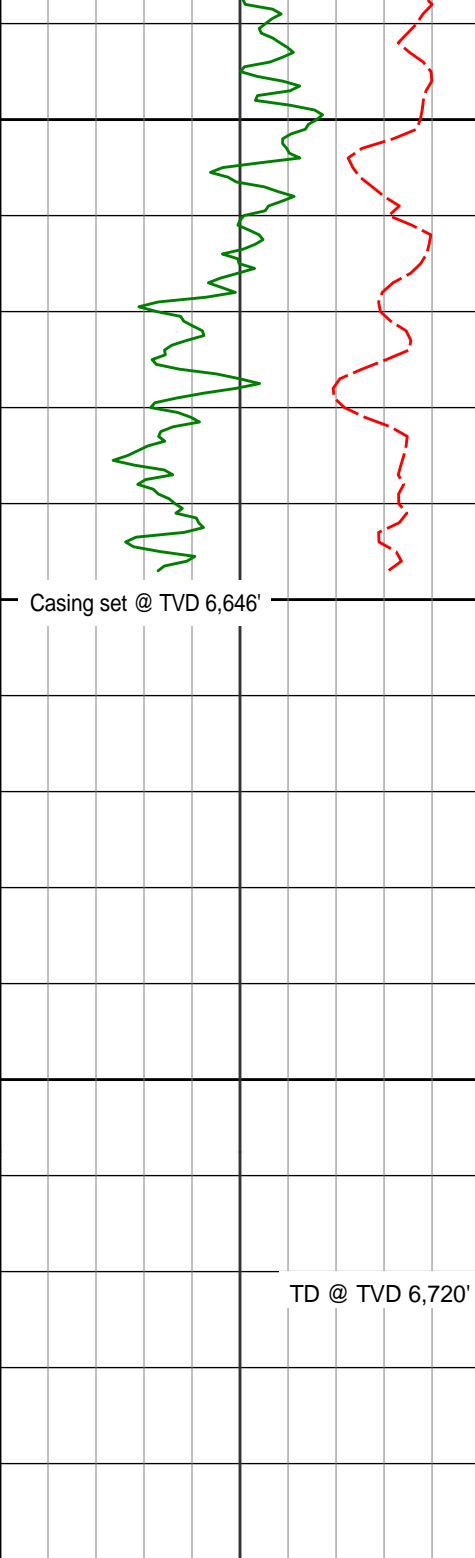
6785'

63.76°

269.27°

6570.84'

703.87'



6833'	68.54°	269.59°	6590.24'	747.72'
6880'	72.16°	270.88°	6606.05'	791.91'
6927'	75.33°	271.01°	6619.20'	836.93'
6974'	77.39°	270.81°	6630.28'	882.51'
7022'	81.94°	269.61°	6638.89'	929.65'
7047'	84.26°	269.10°	6641.89'	954.45'

Casing set @ TVD 6,646'

TD @ TVD 6,720'

<div><div>Avg Rate of Penetration</div><div>ROPA</div><div>feet per hr</div></div>		Depth ft	Depth	Inc.	Azi.	TVD	V.S.				
500	0										
<div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div></div>											
0	300										



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch State USX AA16-66-1
Wattenberg
Weld Colorado

0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
665.00	0.00	0.00	665.00	0.00 N	0.00 E	0.00	0.00
796.00	0.69	34.60	796.00	0.65 N	0.45 E	-0.48	0.53
891.00	0.63	90.58	890.99	1.12 N	1.30 E	-1.35	0.66
981.00	0.73	104.78	980.99	0.97 N	2.35 E	-2.39	0.21
1071.00	0.79	97.42	1070.98	0.74 N	3.51 E	-3.55	0.13
1348.00	0.79	90.54	1347.95	0.48 N	7.30 E	-7.31	0.03
1443.00	1.37	83.51	1442.93	0.60 N	9.08 E	-9.10	0.63
1538.00	1.33	80.29	1537.91	0.91 N	11.30 E	-11.34	0.09
1633.00	1.42	75.26	1632.88	1.40 N	13.53 E	-13.59	0.16
1728.00	1.99	150.30	1727.85	0.27 N	15.49 E	-15.49	2.24
1822.00	3.13	182.24	1821.76	3.72 S	16.20 E	-16.00	1.90
1916.00	3.96	205.10	1915.58	9.23 S	14.73 E	-14.25	1.72
2011.00	5.47	212.90	2010.26	16.00 S	10.88 E	-10.07	1.73
2106.00	6.82	222.14	2104.71	23.98 S	4.63 E	-3.45	1.75
2201.00	8.12	224.54	2198.90	32.94 S	3.86 W	5.47	1.41
2295.00	11.16	220.93	2291.57	44.55 S	14.47 W	16.65	3.30
2390.00	12.71	225.03	2384.51	58.88 S	27.89 W	30.75	1.85
2485.00	14.02	221.71	2476.94	74.86 S	42.94 W	46.57	1.60
2579.00	13.15	221.38	2568.31	91.38 S	57.59 W	62.01	0.93
2674.00	14.37	220.69	2660.58	108.43 S	72.41 W	77.66	1.29
2769.00	13.06	221.87	2752.87	125.36 S	87.26 W	93.33	1.40
2863.00	14.52	218.48	2844.16	142.50 S	101.69 W	108.58	1.77
2958.00	13.97	217.28	2936.24	160.95 S	116.05 W	123.83	0.66
3052.00	14.96	217.54	3027.26	179.60 S	130.32 W	138.99	1.06
3147.00	13.33	217.43	3119.37	198.03 S	144.45 W	154.01	1.72
3241.00	13.97	215.49	3210.72	215.87 S	157.62 W	168.05	0.83
3335.00	12.93	217.19	3302.14	233.49 S	170.56 W	181.84	1.18
3430.00	13.31	217.41	3394.66	250.64 S	183.63 W	195.74	0.41
3525.00	13.67	217.54	3487.03	268.23 S	197.12 W	210.07	0.38
3618.00	14.03	221.08	3577.33	285.45 S	211.22 W	225.01	0.99
3713.00	16.14	219.66	3669.05	304.30 S	227.22 W	241.91	2.25
3807.00	16.90	217.92	3759.17	325.13 S	243.95 W	259.65	0.97
3902.00	15.47	219.49	3850.41	345.81 S	260.50 W	277.19	1.58
3996.00	13.75	218.17	3941.36	364.26 S	275.37 W	292.96	1.87
4090.00	9.37	218.31	4033.44	379.05 S	287.02 W	305.32	4.66
4185.00	7.12	218.13	4127.45	389.75 S	295.45 W	314.26	2.37
4280.00	4.17	223.27	4221.98	396.89 S	301.45 W	320.61	3.15
4374.00	1.53	197.44	4315.86	400.58 S	304.17 W	323.51	3.05
4469.00	1.24	189.45	4410.83	402.81 S	304.72 W	324.17	0.37
4563.00	1.25	166.64	4504.81	404.81 S	304.65 W	324.19	0.52
4657.00	1.94	137.99	4598.77	406.98 S	303.35 W	323.00	1.10
4752.00	2.74	123.96	4693.69	409.45 S	300.38 W	320.16	1.03
4846.00	1.87	118.50	4787.62	411.44 S	297.17 W	317.05	0.95
4940.00	1.52	141.68	4881.58	413.15 S	295.04 W	315.01	0.81
5035.00	1.96	132.50	4976.53	415.23 S	293.07 W	313.14	0.55
5129.00	1.34	127.88	5070.49	416.99 S	291.02 W	311.18	0.67
5224.00	0.99	147.11	5165.47	418.36 S	289.69 W	309.92	0.55
5319.00	0.93	148.88	5260.46	419.71 S	288.85 W	309.15	0.06
5413.00	1.07	141.35	5354.44	421.05 S	287.90 W	308.27	0.20
5507.00	1.15	136.17	5448.43	422.42 S	286.70 W	307.14	0.14
5602.00	0.83	116.32	5543.41	423.42 S	285.42 W	305.90	0.49
5696.00	1.21	115.50	5637.40	424.15 S	283.91 W	304.44	0.40
5791.00	0.70	108.43	5732.38	424.76 S	282.46 W	303.02	0.55
5888.00	1.01	91.16	5829.37	424.97 S	281.05 W	301.62	0.41
5983.00	0.59	31.17	5924.37	424.56 S	279.96 W	300.51	0.92
6030.00	4.20	289.66	5971.32	423.77 S	281.45 W	301.96	9.28
6077.00	9.31	275.00	6017.99	422.86 S	286.87 W	307.32	11.37
6124.00	13.10	266.97	6064.08	422.81 S	295.98 W	316.42	8.72
6172.00	16.50	266.10	6110.48	423.56 S	308.21 W	328.68	7.08
6219.00	19.93	265.75	6155.12	424.61 S	322.86 W	343.36	7.31
6266.00	23.51	265.72	6198.78	425.90 S	340.21 W	360.75	7.61
6313.00	26.79	268.96	6241.32	426.80 S	360.15 W	380.71	7.57
6361.00	30.28	272.63	6283.49	426.44 S	383.06 W	403.58	8.14
6408.00	33.20	276.41	6323.46	424.46 S	407.69 W	428.08	7.51
6455.00	33.77	273.15	6362.66	422.30 S	433.53 W	453.78	4.01
6502.00	37.71	269.07	6400.81	421.82 S	460.96 W	481.15	9.79
6549.00	43.14	269.50	6436.57	422.19 S	491.42 W	511.60	11.56

6596.00	47.89	269.02	6469.50	422.63 S	524.94 W	545.10	10.14
6644.00	54.07	269.30	6499.70	423.17 S	562.21 W	582.35	12.88
6691.00	59.25	269.04	6525.52	423.75 S	601.46 W	621.58	11.02
6738.00	60.84	268.65	6548.99	424.57 S	642.17 W	662.28	3.45
6785.00	63.76	269.27	6570.84	425.33 S	683.77 W	703.87	6.33
6833.00	68.54	269.59	6590.24	425.76 S	727.65 W	747.72	9.98
6880.00	72.16	270.88	6606.05	425.57 S	771.91 W	791.91	8.12
6927.00	75.33	271.01	6619.20	424.83 S	817.02 W	836.93	6.77
6974.00	77.39	270.81	6630.28	424.10 S	862.68 W	882.51	4.40
7022.00	81.94	269.61	6638.89	423.93 S	909.89 W	929.65	9.79
7047.00	84.26	269.10	6641.89	424.21 S	934.71 W	954.45	9.49
7209.00	88.49	266.68	6652.13	430.16 S	1096.23 W	1116.06	3.01
7303.00	91.36	269.54	6652.25	433.26 S	1190.16 W	1210.03	4.30
7398.00	88.67	267.85	6652.23	435.43 S	1285.12 W	1304.98	3.34
7492.00	91.17	269.44	6652.36	437.65 S	1379.08 W	1398.94	3.15
7587.00	90.68	269.51	6650.82	438.52 S	1474.06 W	1493.85	0.53
7682.00	91.08	272.02	6649.37	437.25 S	1569.04 W	1588.65	2.68
7777.00	91.51	271.09	6647.22	434.67 S	1663.98 W	1683.35	1.09
7871.00	89.20	270.99	6646.64	432.97 S	1757.95 W	1777.13	2.46
7966.00	89.26	270.07	6647.92	432.08 S	1852.94 W	1871.95	0.97
8061.00	90.00	270.41	6648.53	431.68 S	1947.94 W	1966.82	0.86
8155.00	87.47	268.87	6650.61	432.27 S	2041.90 W	2060.70	3.15
8250.00	90.80	269.84	6652.04	433.33 S	2136.87 W	2155.60	3.65
8344.00	91.02	268.85	6650.54	434.41 S	2230.85 W	2249.52	1.08
8439.00	90.31	269.35	6649.45	435.90 S	2325.83 W	2344.46	0.91
8533.00	89.94	269.22	6649.24	437.08 S	2419.82 W	2438.40	0.42
8627.00	90.28	270.19	6649.07	437.57 S	2513.82 W	2532.30	1.10
8722.00	88.31	268.56	6650.24	438.60 S	2608.80 W	2627.22	2.69
8816.00	87.85	267.80	6653.39	441.59 S	2702.70 W	2721.15	0.95
8910.00	88.92	269.02	6656.05	444.20 S	2796.62 W	2815.09	1.73
9005.00	89.08	270.32	6657.71	444.74 S	2891.60 W	2909.98	1.38
9100.00	89.32	269.92	6659.03	444.54 S	2986.59 W	3004.85	0.49
9194.00	89.08	270.26	6660.35	444.39 S	3080.58 W	3098.72	0.45
9289.00	88.74	270.05	6662.16	444.13 S	3175.57 W	3193.57	0.42
9384.00	89.01	268.12	6664.03	445.65 S	3270.53 W	3288.50	2.05
9478.00	91.20	268.71	6663.85	448.24 S	3364.49 W	3382.47	2.41
9572.00	90.40	268.68	6662.53	450.39 S	3458.45 W	3476.43	0.85
9667.00	88.12	267.63	6663.76	453.45 S	3553.39 W	3571.40	2.64
9761.00	89.23	268.99	6665.93	456.22 S	3647.32 W	3665.35	1.87
9856.00	89.44	268.87	6667.03	458.00 S	3742.30 W	3760.30	0.26
9950.00	89.48	268.75	6667.92	459.95 S	3836.27 W	3854.26	0.13
10044.00	89.82	268.59	6668.50	462.13 S	3930.25 W	3948.22	0.40
10139.00	89.66	269.13	6668.94	464.02 S	4025.23 W	4043.18	0.59
10233.00	89.51	269.04	6669.62	465.51 S	4119.21 W	4137.13	0.19
10328.00	89.38	270.05	6670.54	466.26 S	4214.20 W	4232.04	1.06
10420.00	89.72	269.89	6671.26	466.32 S	4306.20 W	4323.93	0.41
10512.00	89.54	269.56	6671.85	466.75 S	4398.20 W	4415.83	0.41
10603.00	89.75	268.64	6672.41	468.18 S	4489.18 W	4506.78	1.05
10694.00	89.69	268.47	6672.85	470.48 S	4580.15 W	4597.75	0.20
10785.00	89.23	269.72	6673.71	471.92 S	4671.13 W	4688.70	1.46
10876.00	89.32	269.70	6674.86	472.38 S	4762.13 W	4779.60	0.10
10968.00	90.71	270.77	6674.84	472.00 S	4854.12 W	4871.47	1.90
11059.00	90.15	271.97	6674.15	469.83 S	4945.09 W	4962.22	1.45
11150.00	89.54	272.17	6674.40	466.55 S	5036.03 W	5052.89	0.71
11240.00	88.83	270.30	6675.68	464.61 S	5126.00 W	5142.65	2.22
11330.00	90.86	269.90	6675.92	464.45 S	5215.99 W	5232.52	2.31
11421.00	89.20	268.71	6675.87	465.54 S	5306.98 W	5323.46	2.25
11513.00	88.58	268.15	6677.66	468.06 S	5398.93 W	5415.42	0.91
11605.00	89.54	268.72	6679.17	470.57 S	5490.88 W	5507.38	1.21
11699.00	89.63	267.49	6679.85	473.69 S	5584.82 W	5601.36	1.31
11794.00	89.44	267.94	6680.62	477.48 S	5679.74 W	5696.36	0.52
11888.00	89.14	266.97	6681.78	481.65 S	5773.64 W	5790.35	1.09
11982.00	89.41	268.34	6682.97	485.50 S	5867.55 W	5884.33	1.49
12077.00	89.26	267.95	6684.07	488.58 S	5962.50 W	5979.31	0.44
12172.00	89.72	269.61	6684.91	490.60 S	6057.47 W	6074.27	1.81
12267.00	90.80	270.09	6684.48	490.85 S	6152.47 W	6169.17	1.24
12362.00	89.26	270.05	6684.42	490.74 S	6247.46 W	6264.04	1.62
12456.00	89.72	270.92	6685.26	489.94 S	6341.45 W	6357.88	1.05
12551.00	90.19	270.23	6685.33	488.98 S	6436.45 W	6452.71	0.87
12645.00	89.69	270.80	6685.44	488.13 S	6530.44 W	6546.55	0.80
12739.00	89.91	273.86	6685.76	484.32 S	6624.36 W	6640.16	3.26
12834.00	88.64	272.72	6686.97	478.87 S	6719.19 W	6734.61	1.79
12928.00	89.60	270.50	6688.41	476.23 S	6813.13 W	6828.31	2.57
13023.00	90.83	270.46	6688.05	475.43 S	6908.13 W	6923.15	1.30
13117.00	91.57	270.79	6686.08	474.41 S	7002.10 W	7016.96	0.86

13117.00	91.37	270.73	6688.88	474.41 S	7096.08 W	7110.81	0.88
13211.00	90.28	269.73	6684.57	473.98 S	7096.08 W	7110.81	1.78
13305.00	89.72	270.73	6684.57	473.60 S	7190.08 W	7204.67	1.21
13399.00	88.21	269.61	6686.26	473.32 S	7284.06 W	7298.53	2.00
13494.00	89.35	269.10	6688.28	474.39 S	7379.03 W	7393.44	1.31
13588.00	89.85	269.61	6688.94	475.45 S	7473.02 W	7487.36	0.75
13682.00	89.75	268.56	6689.27	476.95 S	7567.01 W	7581.31	1.12
13777.00	89.54	267.38	6689.86	480.32 S	7661.95 W	7676.30	1.26
13871.00	89.57	268.45	6690.59	483.73 S	7755.88 W	7770.29	1.14
13965.00	89.69	268.85	6691.20	485.95 S	7849.85 W	7864.25	0.44
14059.00	89.85	268.48	6691.57	488.14 S	7943.82 W	7958.22	0.43
14153.00	89.10	266.06	6692.44	492.62 S	8037.71 W	8052.21	2.69
14248.00	90.92	266.35	6692.41	498.91 S	8132.49 W	8147.19	1.94
14342.00	91.11	269.01	6690.75	502.71 S	8226.39 W	8241.16	2.84
14437.00	89.75	269.20	6690.03	504.19 S	8321.38 W	8336.11	1.44
14531.00	89.63	265.93	6690.54	508.18 S	8415.28 W	8430.09	3.48
14592.00	89.60	265.77	6690.95	512.59 S	8476.12 W	8491.07	0.27
14626.00	89.69	268.25	6691.16	514.36 S	8510.07 W	8525.07	7.29
14673.00	90.68	269.82	6691.00	515.15 S	8557.06 W	8572.04	3.95
14719.00	89.05	272.25	6691.12	514.32 S	8603.05 W	8617.93	6.36
14766.00	90.43	273.33	6691.33	512.04 S	8649.99 W	8664.70	3.73
14813.00	89.11	272.43	6691.52	509.68 S	8696.93 W	8711.47	3.41
14860.00	88.59	272.60	6692.47	507.62 S	8743.87 W	8758.26	1.16
14907.00	89.38	272.70	6693.30	505.45 S	8790.81 W	8805.04	1.71
14954.00	88.06	273.93	6694.35	502.73 S	8837.72 W	8851.75	3.85
15002.00	87.97	275.31	6696.01	498.87 S	8885.54 W	8899.32	2.88
15049.00	87.47	274.28	6697.88	494.95 S	8932.33 W	8945.87	2.43
15097.00	88.95	274.08	6699.38	491.45 S	8980.18 W	8993.49	3.11
15191.00	89.81	274.09	6700.39	484.75 S	9073.94 W	9086.80	0.92
15286.00	90.96	273.42	6699.75	478.53 S	9168.73 W	9181.17	1.39
15333.00	91.91	274.04	6698.58	475.47 S	9215.61 W	9227.85	2.42
15380.00	89.14	272.26	6698.15	472.89 S	9262.53 W	9274.58	7.01
15427.00	90.31	273.68	6698.38	470.46 S	9309.47 W	9321.34	3.92
15475.00	89.38	270.79	6698.51	468.58 S	9357.43 W	9369.15	6.32
15522.00	90.46	272.60	6698.57	467.19 S	9404.40 W	9416.00	4.48
15570.00	90.31	272.30	6698.25	465.13 S	9452.36 W	9463.79	0.70
15665.00	86.39	271.51	6700.98	461.97 S	9547.25 W	9558.41	4.21
15759.00	86.33	269.55	6706.95	461.10 S	9641.05 W	9652.06	2.08
15854.00	86.60	267.86	6712.80	463.25 S	9735.84 W	9746.84	1.80
15949.00	88.03	266.29	6717.26	468.10 S	9830.61 W	9841.73	2.23
16042.00	87.84	265.28	6720.61	474.93 S	9923.29 W	9934.64	1.11
16136.00	90.34	265.47	6722.10	482.51 S	10016.97 W	10028.58	2.66
16231.00	90.86	264.34	6721.10	490.95 S	10111.58 W	10123.49	1.31
16294.00	90.86	264.34	6720.16	497.16 S	10174.27 W	10186.41	0.00

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 267.20 DEGREES (GRID)
A TOTAL CORRECTION OF 7.84 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16294.00 FEET
IS 10186.41 FEET ALONG 267.20 DEGREES (GRID)**