

## PCG Pressure Case Gamma PCD Pressure Case Directional

[illegible]

## WELL INFORMATION

<b>MWD Run Number</b>	100	200			
<b>Date run completed</b>	14-Apr-14	15-Apr-14			
<b>Rig Bit Number</b>	2	3			
<b>Bit Size (in)</b>	8.750	8.750			
<b>Tool Nominal OD (in)</b>	6.750	6.750			
<b>Log Start Depth (TVD, ft)</b>	630.00	5,724.67			
<b>Log End Depth (TVD, ft)</b>	5,724.67	6,421.30			
<b>Drill or Wipe</b>	Drill	Drill			
<b>Drill/Wipe Start Date and Time</b>	13-Apr-14 09:45	15-Apr-14 02:00			
<b>Drill/Wipe End Date and Time</b>	14-Apr-14 06:00	15-Apr-14 12:30			
<b>Min Inc (deg) @ Depth (TVD, ft)</b>	0.14 @ 4,576.71	6.58 @ 5,811.45			
<b>Max Inc (deg) @ Depth (TVD, ft)</b>	7.60 @ 2,113.12	76.89 @ 6,409.19			
<b>Bit TFA(in2) / Bit Type</b>	1.24 / PDC	1.24 / PDC			
<b>Flow Rate (gpm)</b>	595.12	549.26			
<b>Max AV (fpm) / CV (fpm) @ MWD</b>	477.0 / 500.0	452.0 / 425.0			
<b>Fluid Type</b>	Native/Spud Mud	Fresh Water Gel			
<b>Density (ppg) / Viscosity (spqt)</b>	9.25 / 47.00	10.30 / 43.00			
<b>Filtrate CL (ppm)</b>	2,100.00	1,900.00			
<b>pH / Fluid Loss (mptm)</b>	9.00 / 5	9.20 / 5			
<b>PV (cP) / YP (lbf2)</b>	13 / 12.00	12 / 10.00			
<b>% Solids / % Sand</b>	6.70 / 0.30	9.2 / .4			
<b>% Oil / Oil:Water Ratio</b>	NA / NA	NA / NA			
<b>Rm @ Measured Temp (degF)</b>	N/A @ N/A	NA @ NA			
<b>Rmf @ Measured Temp (degF)</b>	N/A @ N/A	NA @ NA			
<b>Rmc @ Measured Temp (degF)</b>	N/A @ N/A	NA @ NA			
<b>Max Tool Temp (in F) / S</b>	454.00 / PCM	470.47 / PCM			

Max Tool Temp (degF) / Source	154.30 / PCM	158.47 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	NA @ NA			
Lead MWD Engineer	Brett Vandergon	Brett Vandergon			
Customer Representative	Johnny Sanchez	Johnny Sanchez			

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.84	5.84			
Sub Serial Number	11341327	11341327			
Insert Serial Number	11227573	11227573			
Date and Time Initialized	12-Apr-14 16:51	01-Jan-70 00:00			
Date and Time Read	16-Apr-14 02:55	16-Apr-14 03:00			
ECMB SW Version	N/A	N/A			

### Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	57.00	55.00			
Software Version	6.21	6.21			
Sub Serial Number	11341327	11341327			
Sonde Serial Number	11638605	11638605			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	101.52	180.27			

### Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.69	47.92			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11341327	11341327			
Insert/Sonde Serial Number	11579834	11579834			

## REMARKS

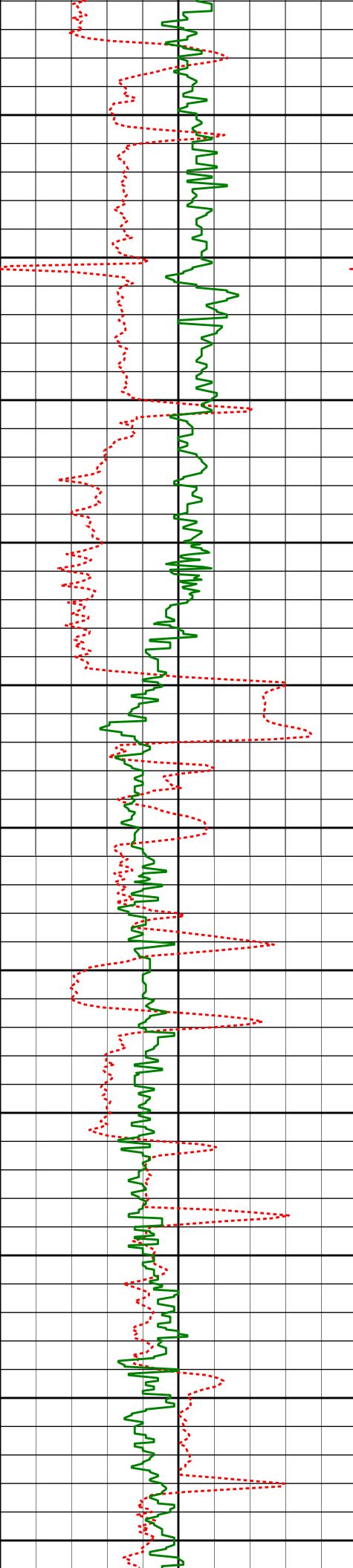
1. All depths are true vertical depths, referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annual velocities are calculated using the "Power Law" model for water 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 8.0

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TVD Main Log 1:600

Average Rate of Penetration ROPA						
1K0						
feet per hr						
PCG Gamma Ray BCorr PGRC		True Vertical				
0200		Depth (ft)	Depth	Inc	Azi.	TVDV.S.
api		1:600				
		3000'				
		3050'				
		3064'	3064'	0.22°	32.73°	3059.91'73.28'
		3100'				
		3150'				
		3200'				
		3250'	3254'	0.46°	47.38°	3249.91'72.50'



3300'

3350'

3400'

3450'

3500'

3550'

3600'

3650'

3700'

3750'

3800'

3349'

0.43°

256.72°

3344.91'

72.56'

3443'

0.23°

225.37°

3438.90'

73.04'

3538'

1.12°

152.61°

3533.90'

72.78'

3633'

1.08°

169.47°

3628.88'

72.23'

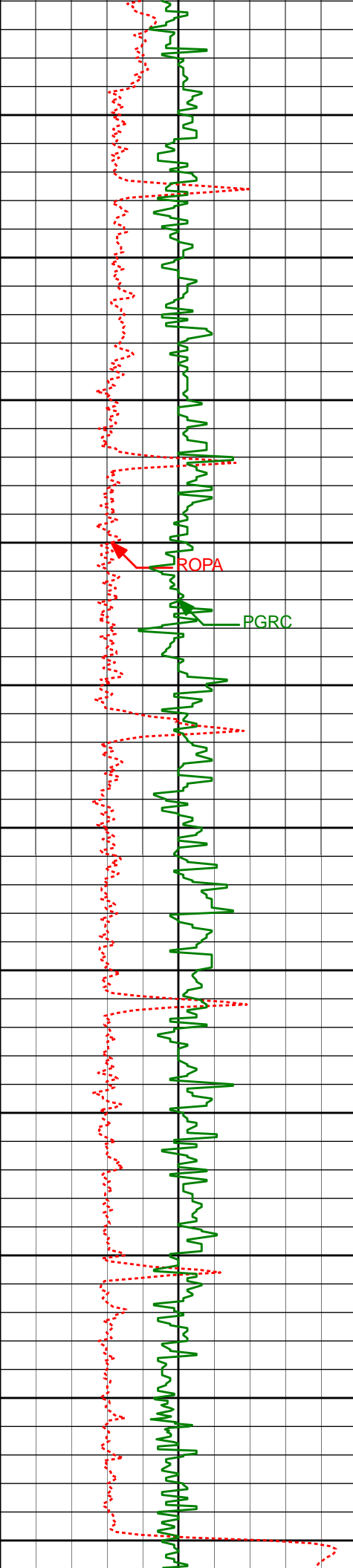
3728'

1.20°

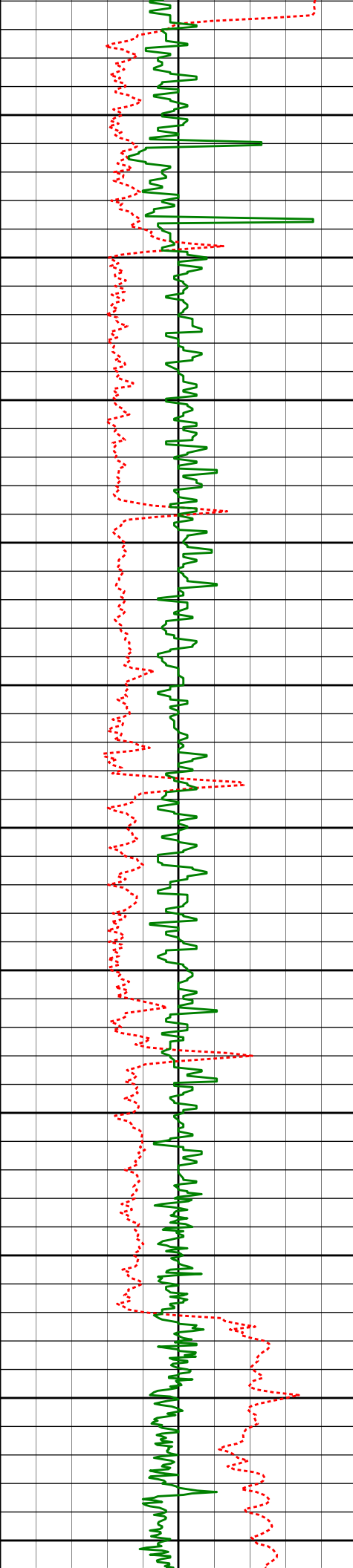
150.30°

3723.86'

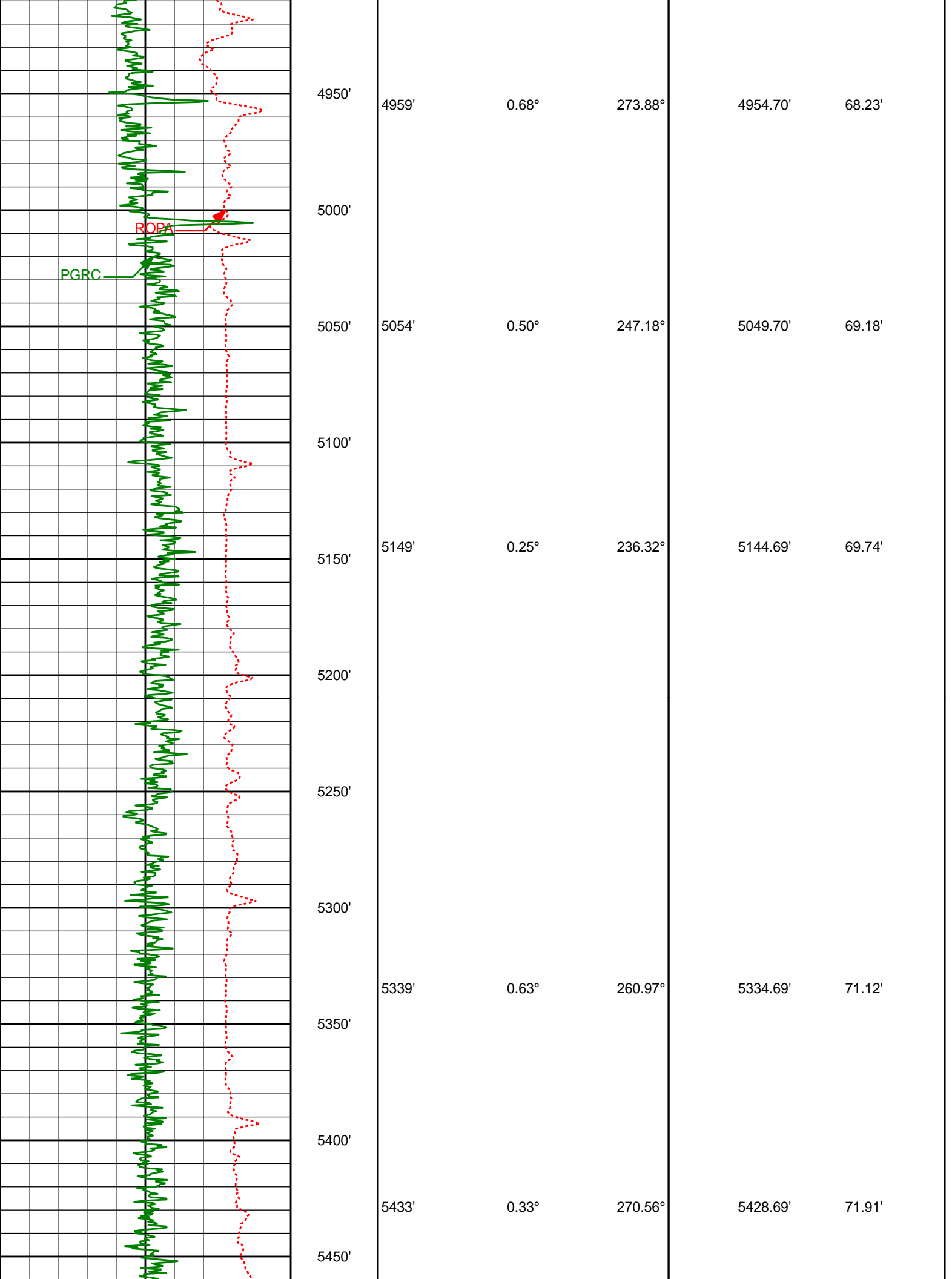
71.62'

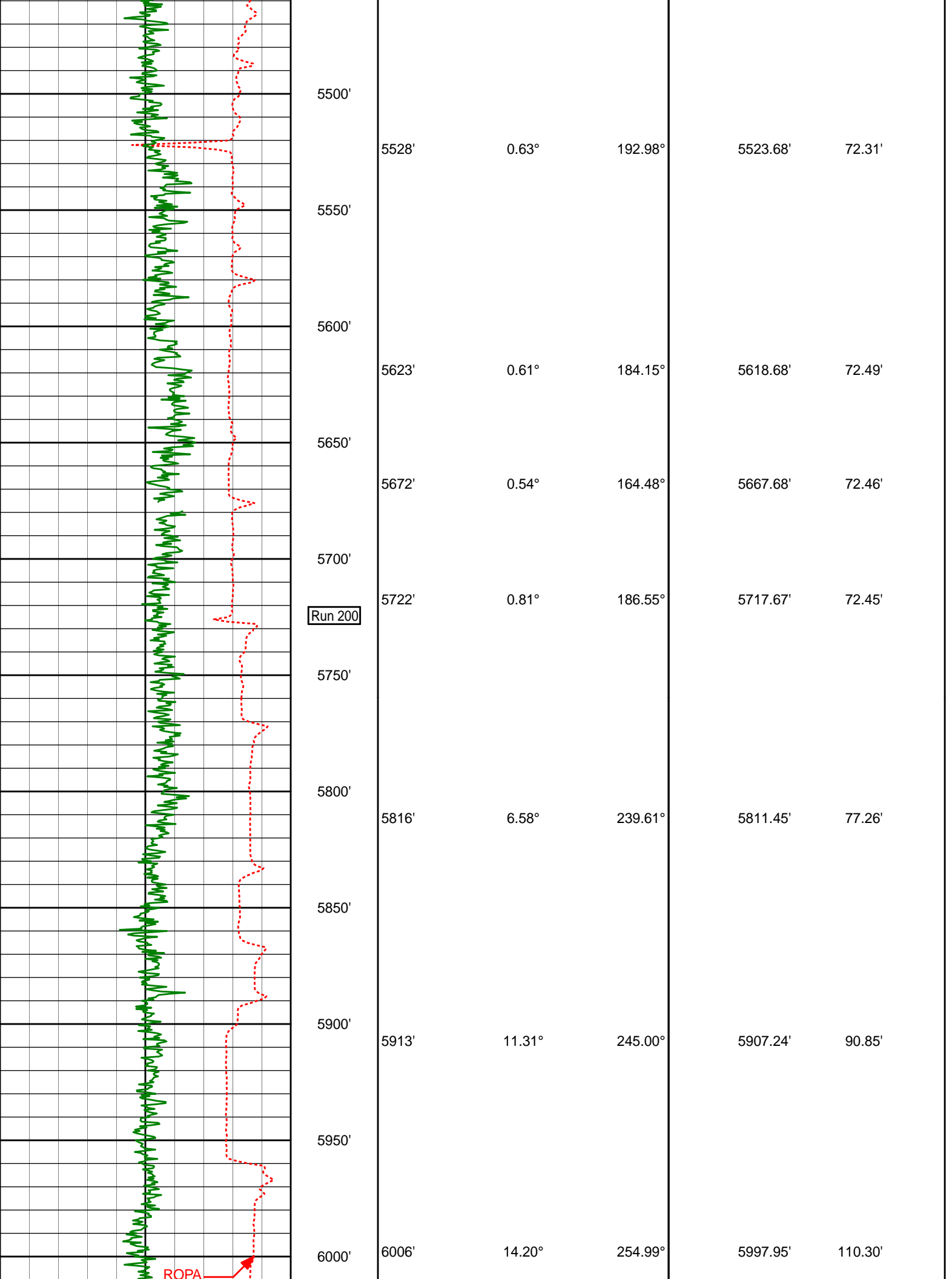


	3822'	1.42°	141.46°	3817.84'	70.45'
3850'					
3900'					
	3917'	1.35°	144.06°	3912.81'	69.10'
3950'					
4000'					
4050'					
4100'	4107'	1.14°	157.66°	4102.76'	67.16'
4150'					
4200'	4202'	1.21°	166.24°	4197.74'	66.61'
4250'					
4300'	4297'	1.05°	176.99°	4292.73'	66.37'
4350'					

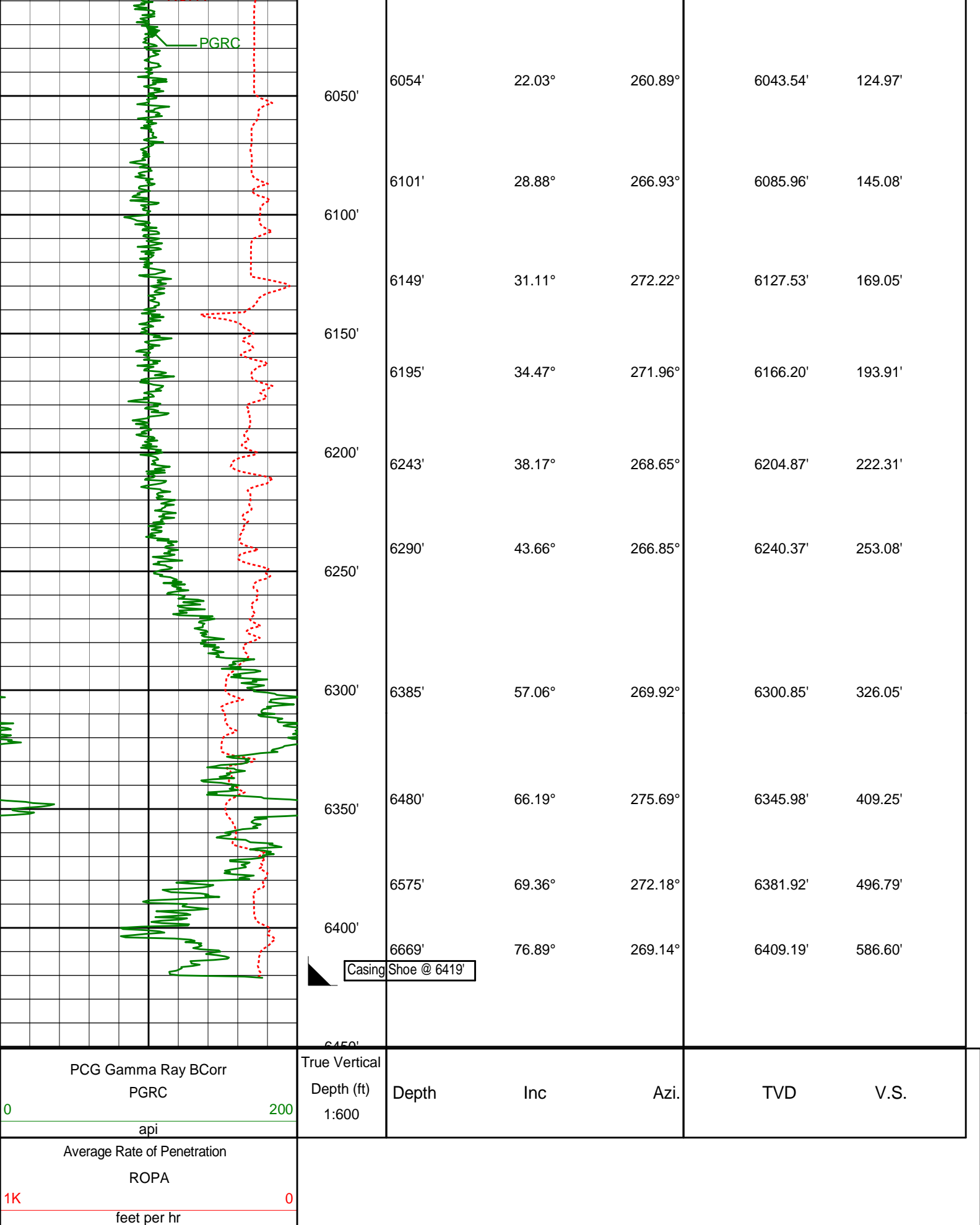


4391'	0.61°	186.55°	4386.72'	66.42'
4400'				
4486'	0.50°	186.65°	4481.71'	66.54'
4500'				
4581'	0.14°	223.70°	4576.71'	66.68'
4600'				
4675'	0.46°	185.88°	4670.71'	66.81'
4700'				
4750'				
4800'				
4865'	0.31°	275.91°	4860.71'	67.42'
4900'				

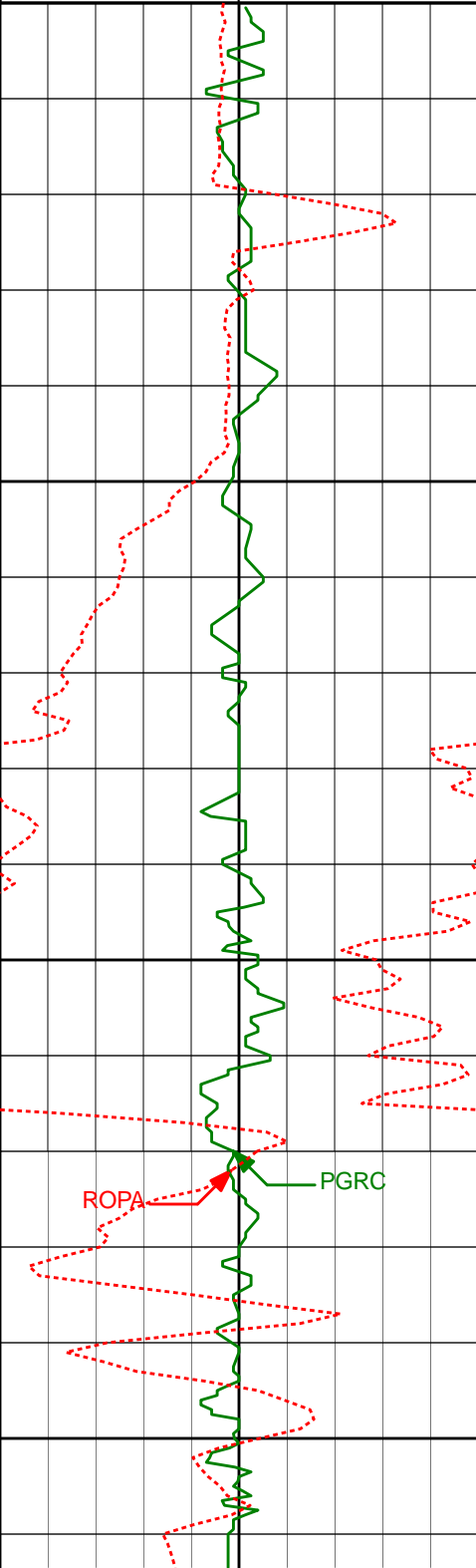


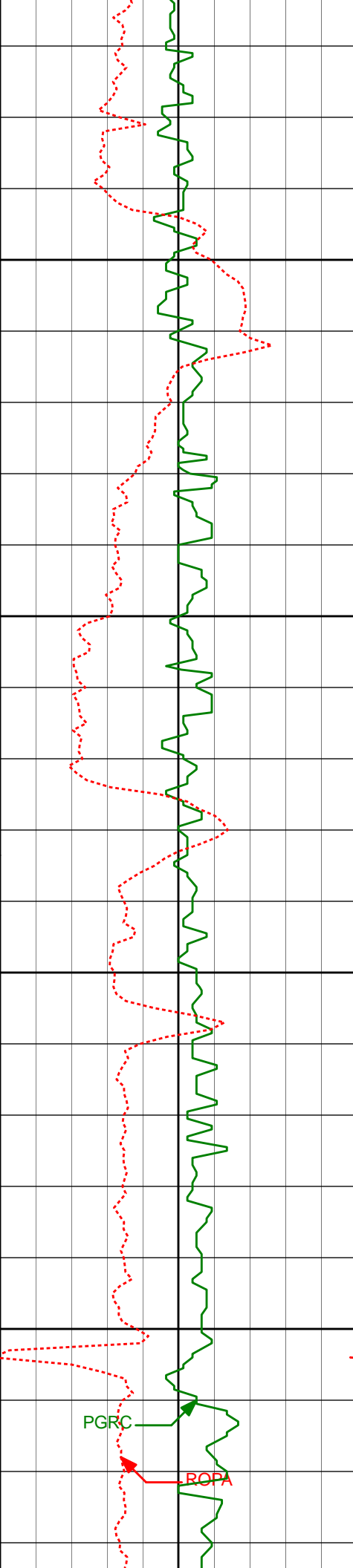






# TVD Main Log 1:240

Average Rate of Penetration ROPA							
1K 0 feet per hr							
PCG Gamma Ray BCorr PGRC		Measured Depth (ft) 1:240	Depth	Inc	Azi.	TVD	V.S.
0 200 api							
		3000'					
		3050'					
		3064'	0.22°	32.73°	3059.91'	73.28'	
		3100'					
		3150'					



3200'

3250'

3300'

3350'

3254'

0.46°

47.38°

3249.91'

72.50'

3349'

0.43°

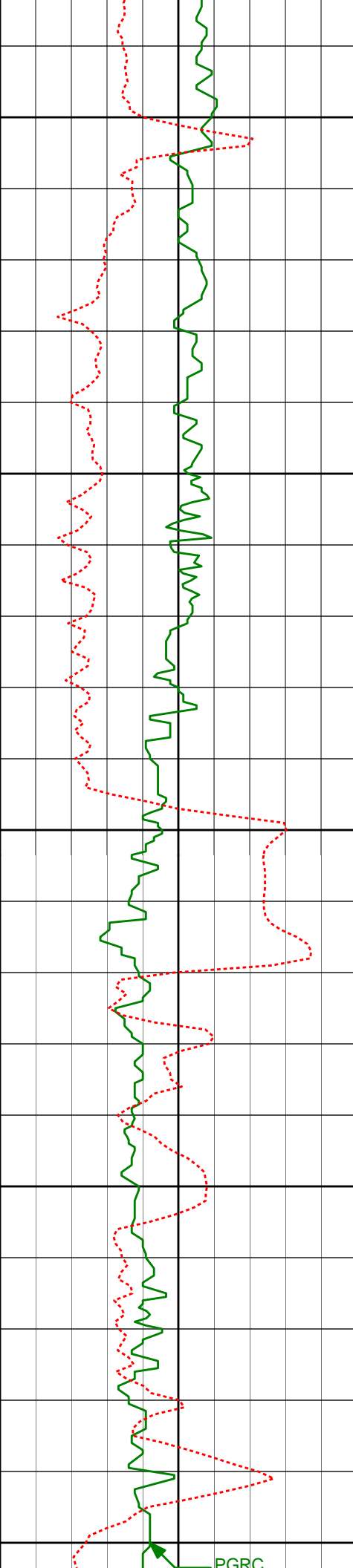
256.72°

3344.91'

72.56'

PGRC

ROPA



3400'

3443'

0.23°

225.37°

3438.90'

73.04'

3450'

3500'

3538'

1.12°

152.61°

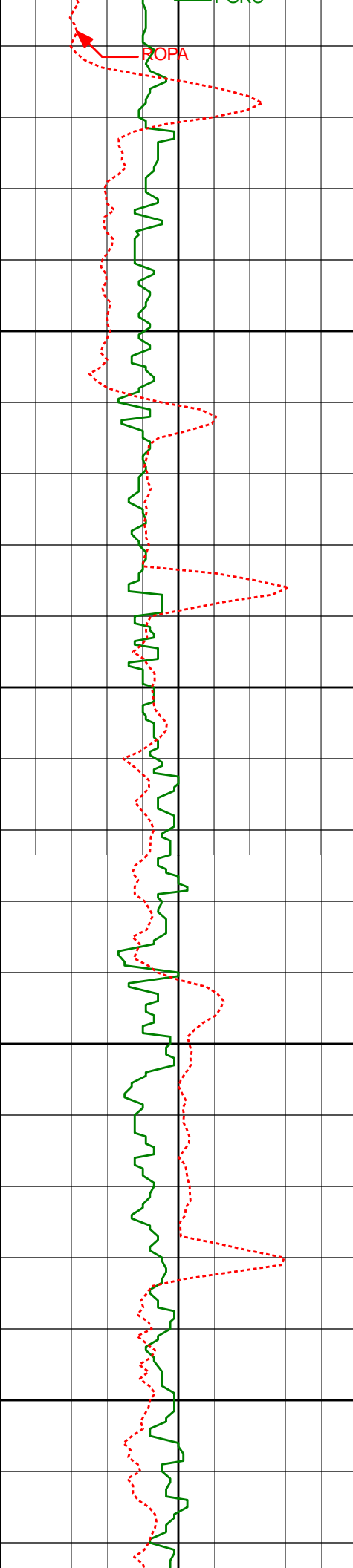
3533.90'

72.78'

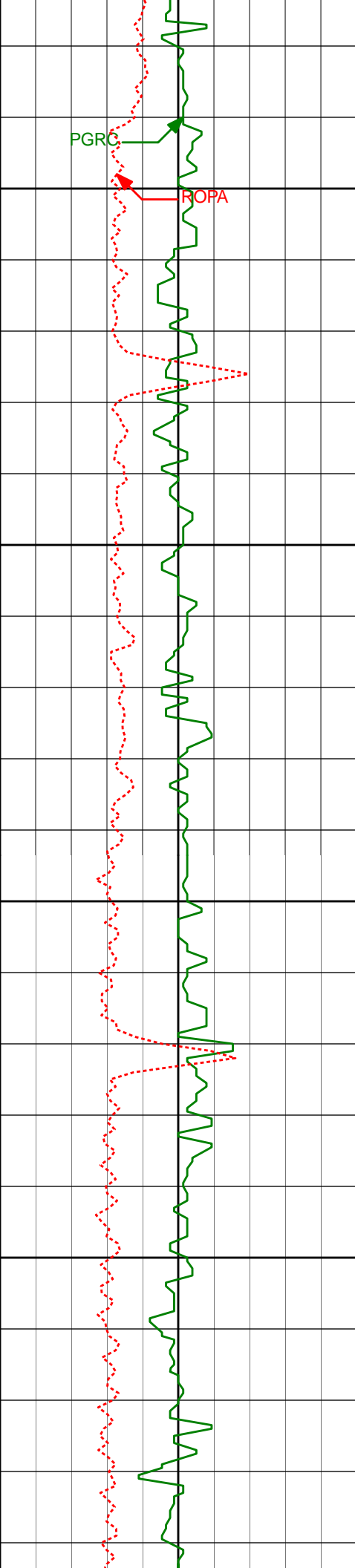
3550'

3600'

PGRC



3633'	1.08°	169.47°	3628.88'	72.23'
3650'				
3700'				
3728'	1.20°	150.30°	3723.86'	71.62'
3750'				
3800'				
3822'	1.42°	141.46°	3817.84'	70.45'



3850'

3900'

3950'

4000'

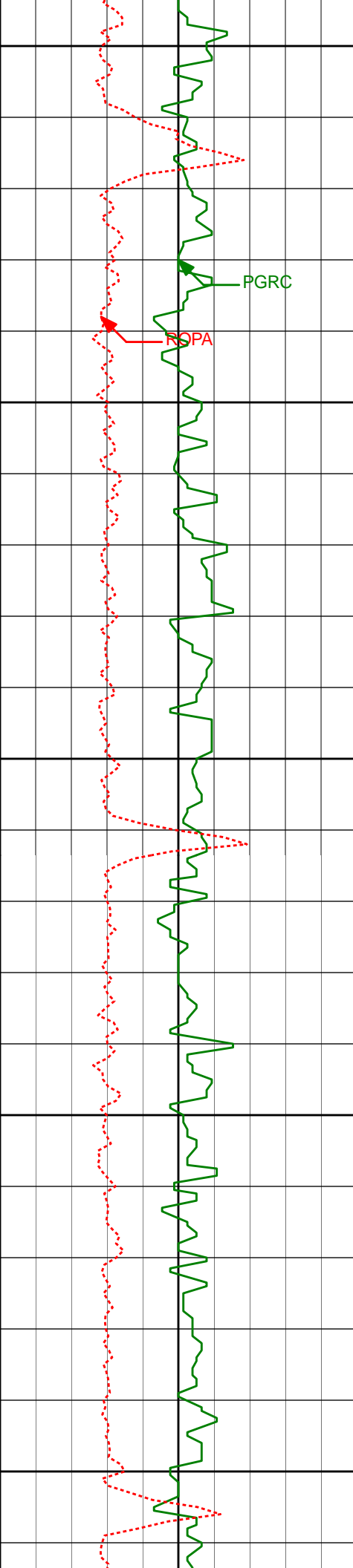
3917'

1.35°

144.06°

3912.81'

69.10'



4050'

4100'

4150'

4200'

4250'

4107'

1.14°

157.66°

4102.76'

67.16'

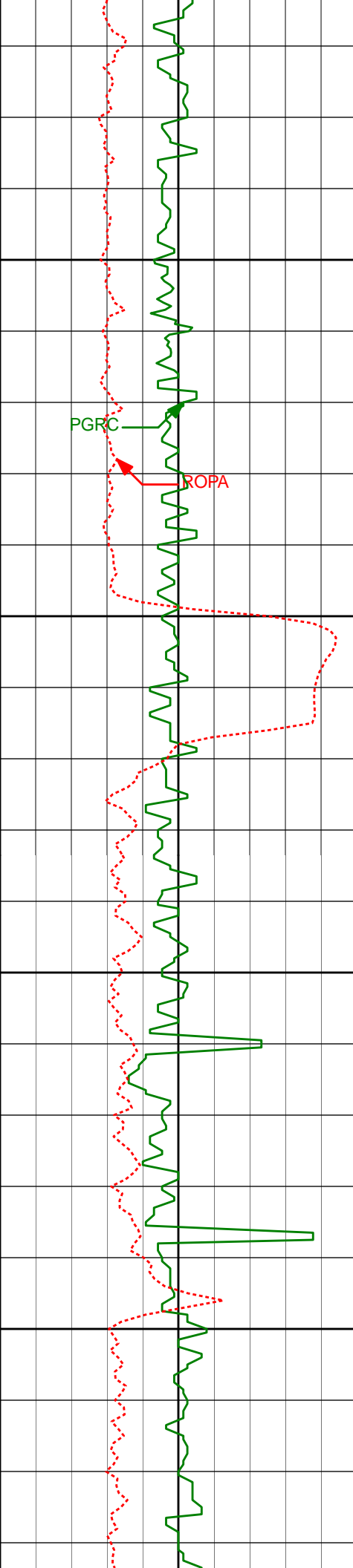
4202'

1.21°

166.24°

4197.74'

66.61'



4297'  
4300'

PGRC

ROPA

4350'

4391'

4400'

4450'

4297'

1.05°

176.99°

4292.73'

66.37'

4391'

0.61°

186.55°

4386.72'

66.42'

4486'

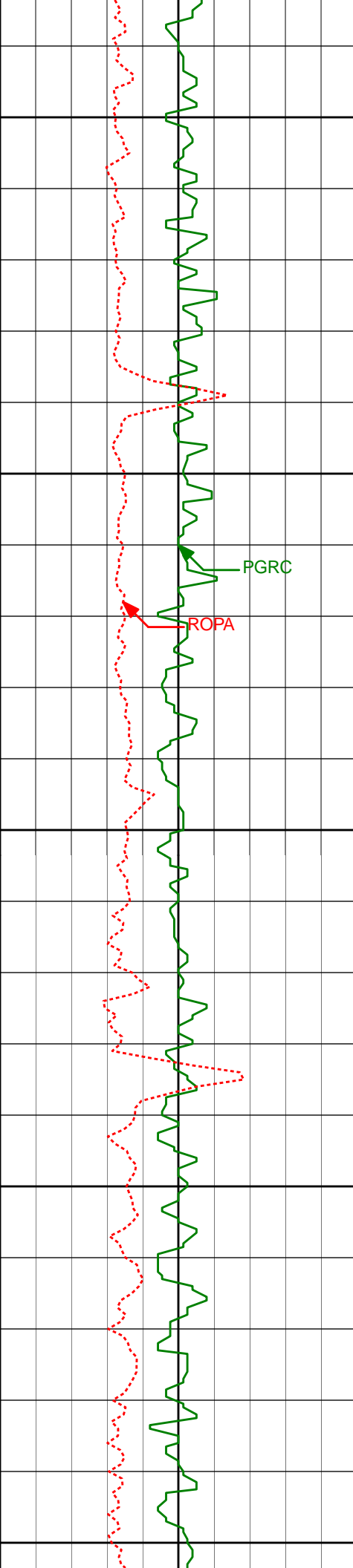
0.50°

186.65°

4481.71'

66.54'





4500'

4550'

4600'

4650'

4700'

PGRC

ROPA

4581'

0.14°

223.70°

4576.71'

66.68'

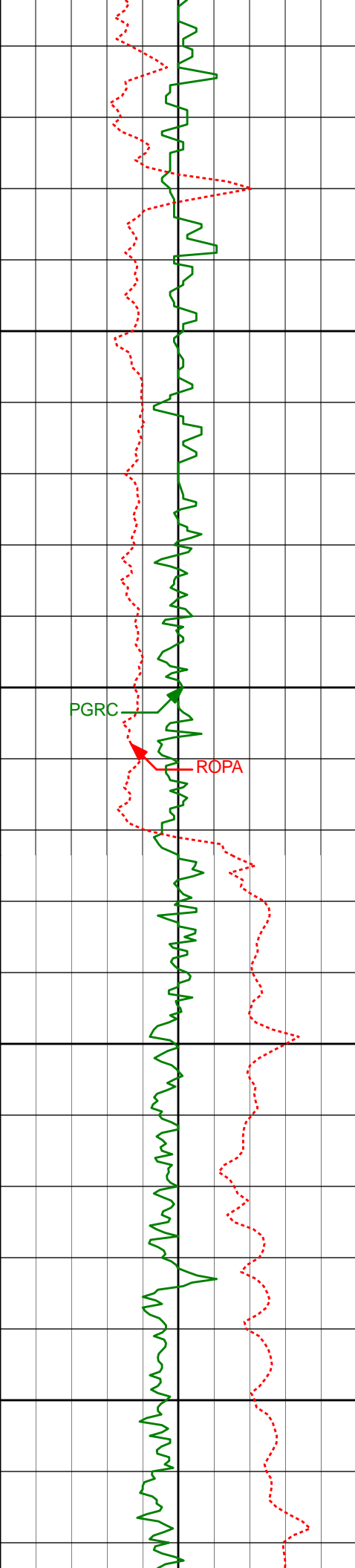
4675'

0.46°

185.88°

4670.71'

66.81'



4750'

4800'

4850'

4900'

PGRC

ROPA

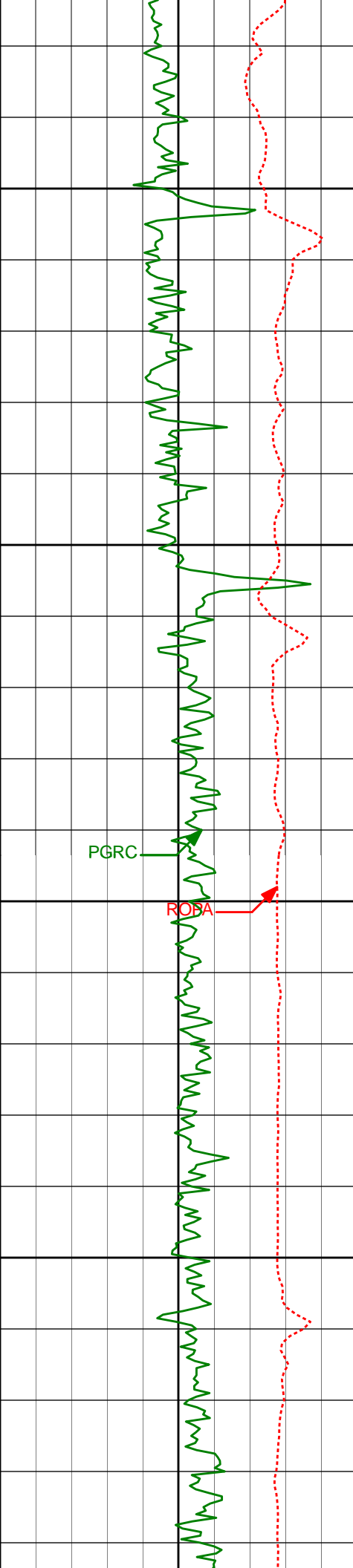
4865'

0.31°

275.91°

4860.71'

67.42'



4950'

4959'

0.68°

273.88°

4954.70'

68.23'

5000'

PGRC

ROPA

5050'

5054'

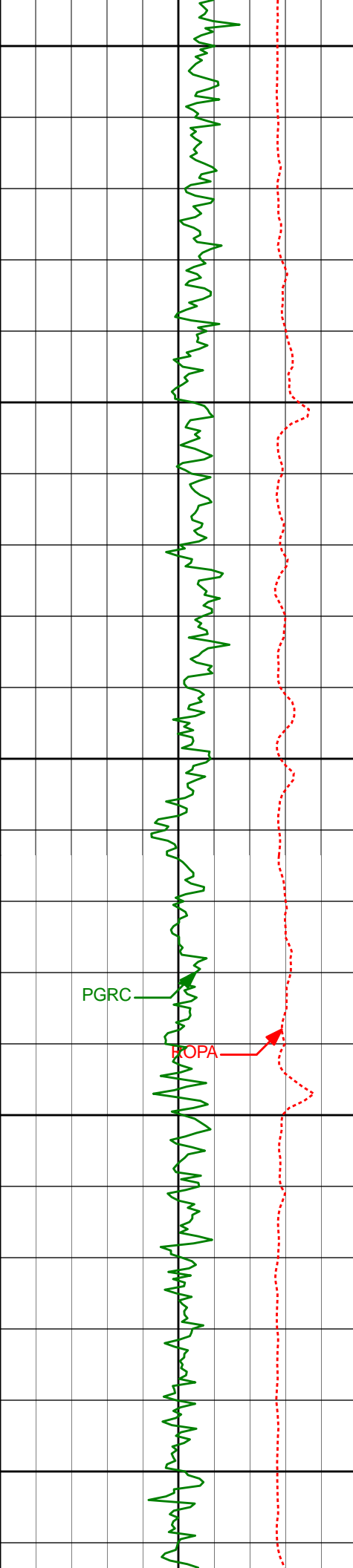
0.50°

247.18°

5049.70'

69.18'

5100'



5150'

5200'

5250'

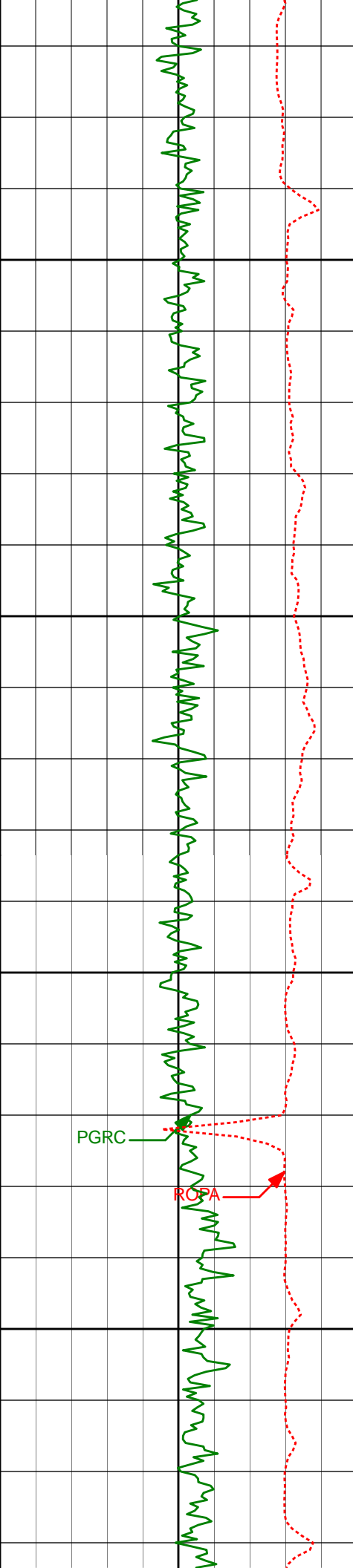
5300'

5350'

PGRC

POPA

5149'	0.25°	236.32°	5144.69'	69.74'
5339'	0.63°	260.97°	5334.69'	71.12'



5400'

5433'

0.33°

270.56°

5428.69'

71.91'

5450'

5500'

PGRC

5528'

0.63°

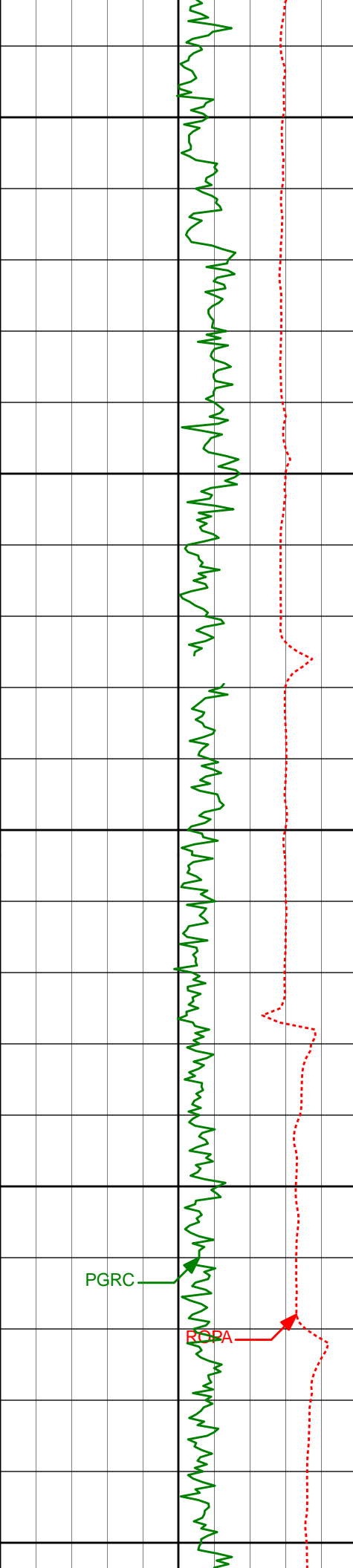
192.98°

5523.68'

72.31'

RGA

5550'



5600'

5623'

0.61°

184.15°

5618.68'

72.49'

5650'

5672'

0.54°

164.48°

5667.68'

72.46'

5700'

5722'

0.81°

186.55°

5717.67'

72.45'

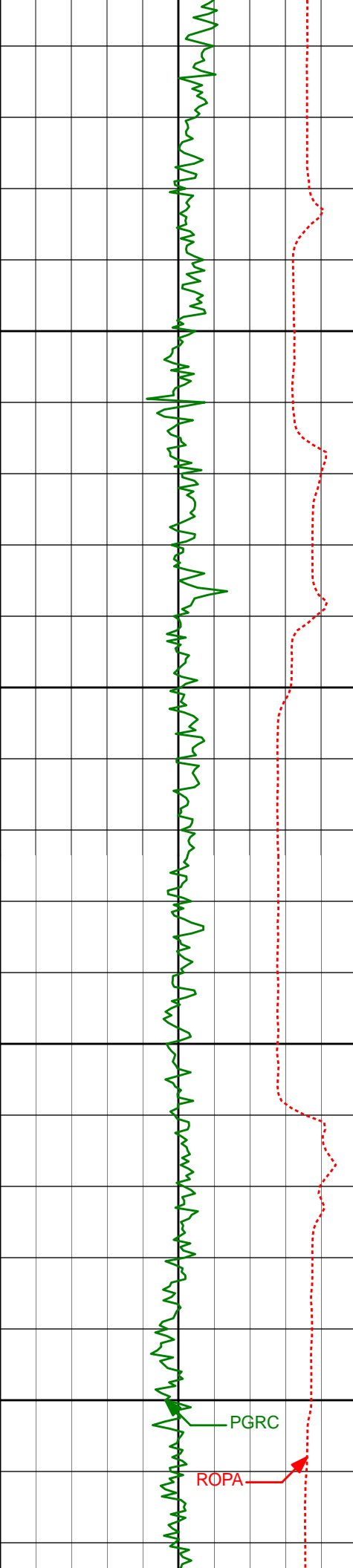
Run 200

5750'

PGRC

RDCA

5800'



5850'

5900'

5950'

6000'

PGRC

ROPA

5816'

6.58°

239.61°

5811.45'

77.26'

5913'

11.31°

245.00°

5907.24'

90.85'

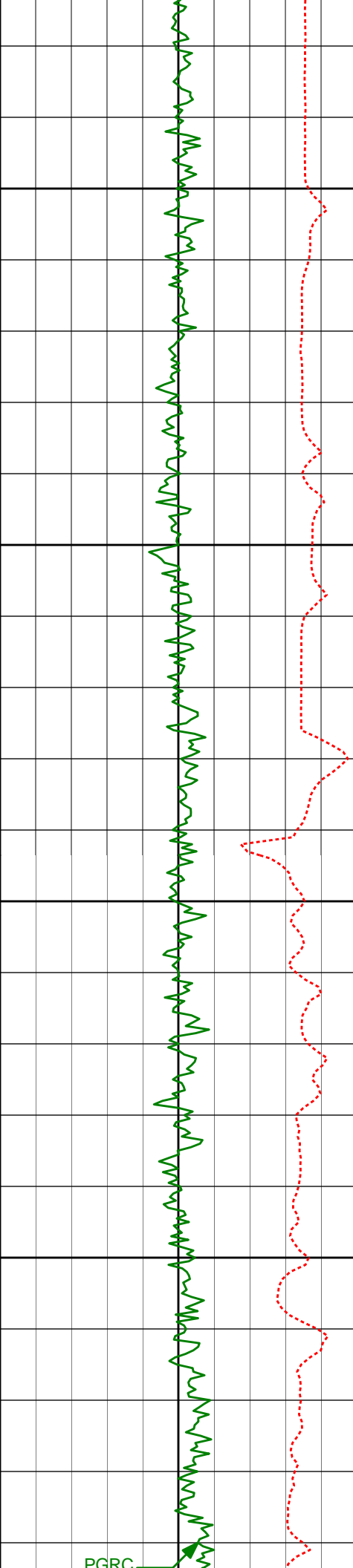
6006'

14.20°

254.99°

5997.95'

110.30'



6050'

6100'

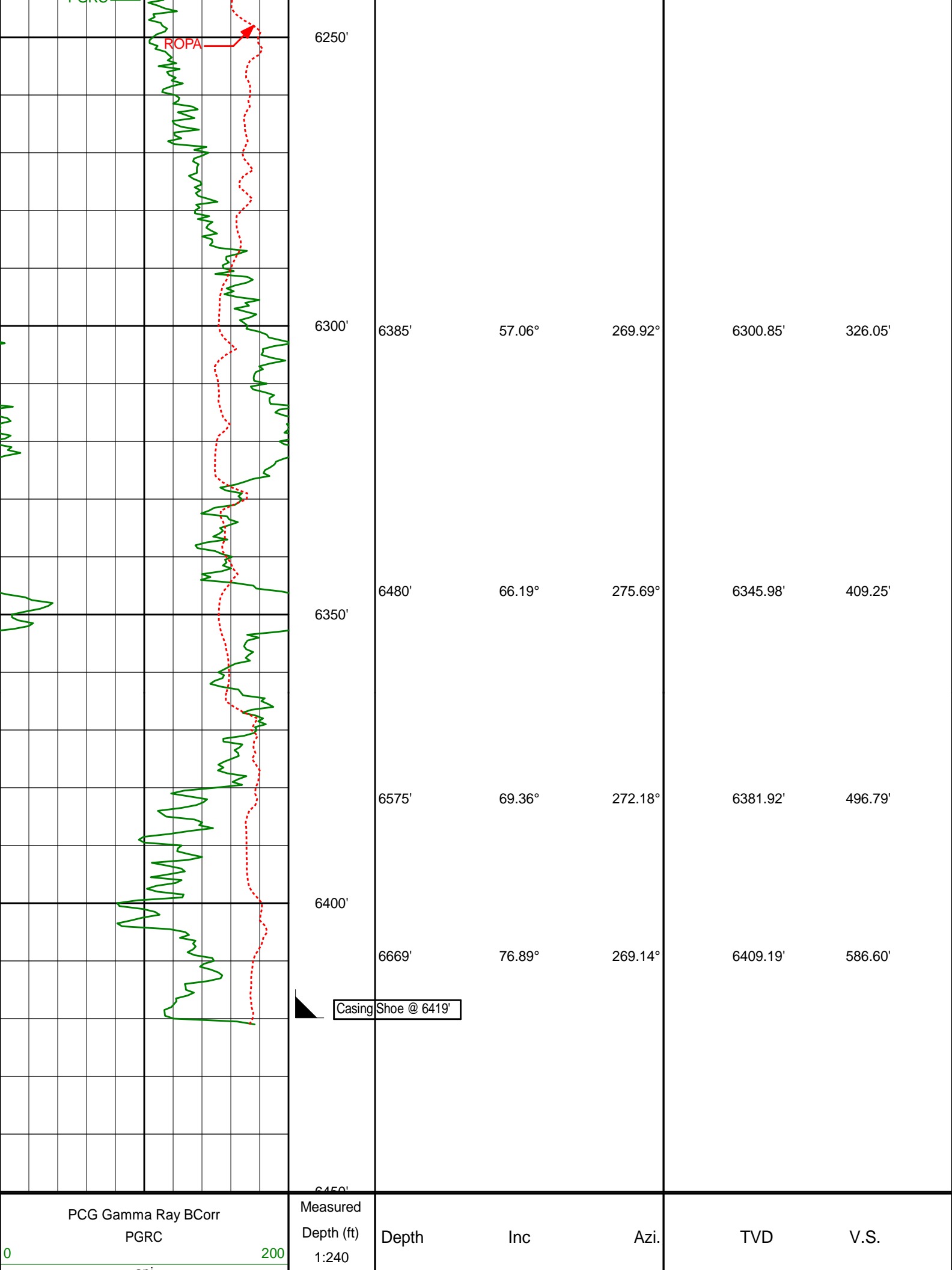
6150'

6200'

6054'	22.03°	260.89°	6043.54'	124.97'
6101'	28.88°	266.93°	6085.96'	145.08'
6149'	31.11°	272.22°	6127.53'	169.05'
6195'	34.47°	271.96°	6166.20'	193.91'
6243'	38.17°	268.65°	6204.87'	222.31'
6290'	43.66°	266.85°	6240.37'	253.08'

PGRC





api			
Average Rate of Penetration			
ROPA			
1K	0		
feet per hr			

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DIRECTIONAL SURVEY REPORT

Noble  
Wells Ranch State AE30-62-1BHNA  
Wattenberg  
Weld Colorado  
USA  
CA-XX-0901134794  
The first two surveys at 345' and 587' are provided by HP.

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
345.00	0.10	135.57	345.00	0.21 S	0.21 E	-0.21	0.03
587.00	0.20	183.57	587.00	0.79 S	0.33 E	-0.31	0.06
713.00	0.21	2.02	713.00	0.78 S	0.33 E	-0.31	0.33
898.00	0.68	20.53	897.99	0.59 N	0.72 E	-0.74	0.26
1083.00	0.55	41.14	1082.98	2.29 N	1.69 E	-1.75	0.14
1177.00	0.81	45.01	1176.98	3.10 N	2.46 E	-2.54	0.28
1270.00	0.87	37.02	1269.97	4.13 N	3.35 E	-3.45	0.14
1363.00	0.77	27.28	1362.96	5.24 N	4.06 E	-4.19	0.18
1457.00	0.83	46.68	1456.95	6.27 N	4.85 E	-5.00	0.29
1548.00	1.03	38.55	1547.94	7.36 N	5.84 E	-6.02	0.26
1641.00	0.79	39.97	1640.92	8.51 N	6.77 E	-6.98	0.26
1735.00	1.64	268.04	1734.91	8.96 N	5.84 E	-6.06	2.39
1830.00	3.99	274.11	1829.79	9.15 N	1.18 E	-1.41	2.49
1925.00	5.92	267.42	1924.43	9.17 N	7.01 W	6.78	2.12
2020.00	6.68	265.18	2018.86	8.48 N	17.41 W	17.19	0.84
2115.00	7.60	265.21	2113.12	7.49 N	29.17 W	28.98	0.97
2210.00	6.96	265.26	2207.35	6.49 N	41.17 W	41.00	0.67
2305.00	6.13	265.77	2301.73	5.64 N	51.97 W	51.81	0.88
2400.00	5.22	266.11	2396.27	4.98 N	61.34 W	61.19	0.96
2495.00	2.35	296.19	2491.06	5.54 N	67.40 W	67.24	3.58
2590.00	1.53	322.05	2586.00	7.40 N	69.92 W	69.72	1.24
2780.00	1.65	314.15	2775.93	11.31 N	73.45 W	73.14	0.13
2875.00	0.51	18.68	2870.92	12.66 N	74.29 W	73.95	1.58
2969.00	0.50	30.05	2964.91	13.41 N	73.95 W	73.60	0.11
3064.00	0.22	32.73	3059.91	13.93 N	73.65 W	73.28	0.30
3254.00	0.46	47.38	3249.91	14.75 N	72.89 W	72.50	0.13
3349.00	0.43	256.72	3344.91	14.92 N	72.96 W	72.56	0.91
3443.00	0.23	225.37	3438.90	14.71 N	73.43 W	73.04	0.28
3538.00	1.12	152.61	3533.90	13.75 N	73.14 W	72.78	1.13
3633.00	1.08	169.47	3628.88	12.05 N	72.55 W	72.23	0.34
3728.00	1.20	150.30	3723.86	10.30 N	71.89 W	71.62	0.42
3822.00	1.42	141.46	3817.84	8.54 N	70.68 W	70.45	0.32
3917.00	1.35	144.06	3912.81	6.71 N	69.29 W	69.10	0.10
4107.00	1.14	157.66	4102.76	3.15 N	67.26 W	67.16	0.19
4202.00	1.21	166.24	4197.74	1.30 N	66.66 W	66.61	0.20
4297.00	1.05	176.99	4292.73	0.54 S	66.38 W	66.37	0.28
4391.00	0.61	186.55	4386.72	1.90 S	66.39 W	66.42	0.49
4486.00	0.50	186.65	4481.71	2.81 S	66.49 W	66.54	0.12
4581.00	0.14	223.70	4576.71	3.31 S	66.62 W	66.68	0.42
4675.00	0.46	185.88	4670.71	3.77 S	66.74 W	66.81	0.38
4865.00	0.31	275.91	4860.71	4.47 S	67.33 W	67.42	0.29
4959.00	0.68	273.88	4954.70	4.41 S	68.14 W	68.23	0.39
5054.00	0.50	247.18	5049.70	4.53 S	69.08 W	69.18	0.34
5149.00	0.25	236.32	5144.69	4.81 S	69.64 W	69.74	0.27
5339.00	0.63	260.97	5334.69	5.20 S	71.02 W	71.12	0.22
5433.00	0.33	270.56	5428.69	5.28 S	71.80 W	71.91	0.33
5528.00	0.63	192.98	5523.68	5.79 S	72.19 W	72.31	0.68
5623.00	0.61	184.15	5618.68	6.80 S	72.34 W	72.49	0.10
5672.00	0.54	164.48	5667.68	7.28 S	72.30 W	72.46	0.42

	5722.00	0.81	186.55	5717.67	7.86 S	72.28 W	72.45	0.74
	5816.00	6.58	239.61	5811.45	11.25 S	77.00 W	77.26	6.52
	5913.00	11.31	245.00	5907.24	18.08 S	90.42 W	90.85	4.95
	6006.00	14.20	254.99	5997.95	24.89 S	109.71 W	110.30	3.90
	6054.00	22.03	260.89	6043.54	27.85 S	124.31 W	124.97	16.73
	6101.00	28.88	266.93	6085.96	29.85 S	144.38 W	145.08	15.57
	6149.00	31.11	272.22	6127.53	29.99 S	168.35 W	169.05	7.20
	6195.00	34.47	271.96	6166.20	29.09 S	193.24 W	193.91	7.31
	6243.00	38.17	268.65	6204.87	28.97 S	221.66 W	222.31	8.72
	6290.00	43.66	266.85	6240.37	30.21 S	252.40 W	253.08	11.95
	6385.00	57.06	269.92	6300.85	32.07 S	325.35 W	326.05	14.32
	6480.00	66.19	275.69	6345.98	27.81 S	408.69 W	409.25	10.99
	6575.00	69.36	272.18	6381.92	21.81 S	496.40 W	496.79	4.78
	6669.00	76.89	269.14	6409.19	20.82 S	586.27 W	586.60	8.59
	6804.00	88.61	268.61	6426.20	23.45 S	719.93 W	720.29	8.69
	6850.00	89.45	268.35	6426.98	24.67 S	765.90 W	766.28	1.91
	6944.00	89.72	268.37	6427.66	27.36 S	859.86 W	860.28	0.29
	7039.00	89.44	268.00	6428.35	30.37 S	954.81 W	955.27	0.49
	7134.00	88.24	268.07	6430.28	33.63 S	1049.73 W	1050.25	1.27
	7229.00	89.20	268.02	6432.40	36.87 S	1144.65 W	1145.22	1.01
	7323.00	87.41	268.97	6435.18	39.34 S	1238.58 W	1239.17	2.16
	7418.00	87.81	269.27	6439.14	40.79 S	1333.48 W	1334.09	0.53
	7513.00	88.18	270.52	6442.47	40.97 S	1428.42 W	1429.00	1.37
	7608.00	88.98	270.46	6444.82	40.16 S	1523.39 W	1523.92	0.84
	7703.00	90.55	271.61	6445.21	38.44 S	1618.37 W	1618.82	2.05
	7798.00	90.22	272.61	6444.57	34.94 S	1713.30 W	1713.64	1.11
	7893.00	90.77	272.31	6443.75	30.87 S	1808.21 W	1808.42	0.66
	7987.00	89.66	270.11	6443.40	28.88 S	1902.18 W	1902.31	2.62
	8082.00	89.97	267.98	6443.70	30.46 S	1997.16 W	1997.30	2.27
	8177.00	90.43	267.99	6443.37	33.80 S	2092.10 W	2092.29	0.48
	8271.00	90.15	267.84	6442.90	37.22 S	2186.04 W	2186.29	0.34
	8365.00	89.78	268.15	6442.96	40.51 S	2279.98 W	2280.28	0.51
	8460.00	89.08	267.09	6443.90	44.46 S	2374.89 W	2375.26	1.34
	8555.00	89.88	266.92	6444.76	49.42 S	2469.76 W	2470.22	0.86
	8650.00	89.20	267.20	6445.52	54.29 S	2564.63 W	2565.18	0.77
	8745.00	90.31	266.89	6445.93	59.19 S	2659.50 W	2660.15	1.21
	8839.00	89.72	266.55	6445.91	64.57 S	2753.34 W	2754.10	0.72
	8934.00	89.57	267.36	6446.50	69.62 S	2848.21 W	2849.06	0.87
	9029.00	88.46	266.66	6448.13	74.57 S	2943.06 W	2944.01	1.38
	9124.00	88.83	266.61	6450.38	80.15 S	3037.87 W	3038.93	0.39
	9219.00	89.63	267.89	6451.65	84.70 S	3132.75 W	3133.89	1.59
	9314.00	89.88	268.66	6452.06	87.56 S	3227.71 W	3228.89	0.85
	9408.00	89.72	269.26	6452.39	89.27 S	3321.69 W	3322.88	0.66
	9503.00	89.11	269.17	6453.36	90.57 S	3416.67 W	3417.87	0.65
	9597.00	88.49	269.35	6455.32	91.78 S	3510.65 W	3511.84	0.69
	9692.00	89.14	269.47	6457.29	92.76 S	3605.62 W	3606.81	0.70
	9786.00	89.11	268.89	6458.72	94.11 S	3699.60 W	3700.80	0.62
	9880.00	89.48	269.58	6459.88	95.36 S	3793.58 W	3794.78	0.83
	9975.00	88.98	269.58	6461.16	96.06 S	3888.57 W	3889.76	0.53
	10069.00	89.57	269.61	6462.35	96.72 S	3982.56 W	3983.73	0.63
	10164.00	87.87	268.50	6464.47	98.29 S	4077.52 W	4078.70	2.14
	10258.00	87.90	268.96	6467.94	100.37 S	4171.43 W	4172.64	0.49
	10353.00	89.88	268.94	6469.78	102.11 S	4266.39 W	4267.61	2.08
	10450.00	90.49	268.58	6469.47	104.21 S	4363.37 W	4364.61	0.73
	10545.00	89.97	270.00	6469.08	105.39 S	4458.36 W	4459.60	1.59
	10638.00	88.86	269.35	6470.03	105.92 S	4551.35 W	4552.58	1.38
	10730.00	90.37	271.01	6470.65	105.63 S	4643.34 W	4644.53	2.44
	10821.00	90.52	269.59	6469.95	105.15 S	4734.34 W	4735.49	1.57
	10914.00	87.93	267.47	6471.20	107.53 S	4827.28 W	4828.46	3.60
	11007.00	88.46	267.50	6474.13	111.61 S	4920.15 W	4921.40	0.57
	11099.00	89.14	267.06	6476.06	115.98 S	5012.02 W	5013.36	0.88
	11192.00	89.69	267.11	6477.01	120.71 S	5104.90 W	5106.32	0.59
	11284.00	89.41	266.35	6477.73	125.96 S	5196.74 W	5198.27	0.88
	11377.00	90.18	267.33	6478.06	131.08 S	5289.60 W	5291.22	1.34
	11469.00	90.37	266.86	6477.62	135.74 S	5381.48 W	5383.19	0.55
	11561.00	89.69	267.31	6477.57	140.42 S	5473.36 W	5475.16	0.89
	11654.00	90.49	269.67	6477.43	142.87 S	5566.32 W	5568.15	2.68
	11747.00	88.83	265.12	6477.98	147.10 S	5659.20 W	5661.10	5.21
	11840.00	89.48	267.77	6479.35	152.86 S	5752.00 W	5754.02	2.93
	11933.00	90.71	269.46	6479.20	155.11 S	5844.97 W	5847.02	2.25
	12027.00	91.11	269.86	6477.71	155.67 S	5938.95 W	5940.99	0.60
	12120.00	88.92	267.52	6477.68	157.80 S	6031.92 W	6033.97	3.45
	12215.00	89.69	270.36	6478.83	159.55 S	6126.88 W	6128.96	3.10
	12310.00	89.45	269.51	6479.55	159.66 S	6221.88 W	6223.92	0.93

12405.00	90.25	268.48	6479.80	161.33 S	6316.86 W	6318.92	1.37
12500.00	89.35	270.62	6480.13	162.07 S	6411.85 W	6413.90	2.44
12595.00	89.60	270.51	6481.00	161.14 S	6506.84 W	6508.84	0.29
12690.00	89.69	269.38	6481.59	161.23 S	6601.84 W	6603.81	1.19
12785.00	89.82	270.16	6481.99	161.61 S	6696.84 W	6698.78	0.83
12880.00	90.28	269.25	6481.91	162.10 S	6791.83 W	6793.76	1.07
12974.00	90.43	268.54	6481.33	163.91 S	6885.81 W	6887.76	0.77
13069.00	90.09	267.83	6480.90	166.92 S	6980.76 W	6982.76	0.83
13164.00	89.48	267.18	6481.25	171.06 S	7075.67 W	7077.74	0.94
13259.00	89.20	267.62	6482.35	175.37 S	7170.57 W	7172.71	0.55
13354.00	87.72	266.23	6484.90	180.46 S	7265.39 W	7267.63	2.14
13449.00	87.66	266.37	6488.73	186.58 S	7360.12 W	7362.48	0.16
13544.00	86.70	266.74	6493.40	192.29 S	7454.83 W	7457.31	1.08
13639.00	87.68	267.68	6498.06	196.90 S	7549.60 W	7552.16	1.43
13734.00	88.27	267.21	6501.42	201.14 S	7644.45 W	7647.08	0.79
13828.00	88.89	267.31	6503.75	205.63 S	7738.31 W	7741.03	0.67
13923.00	90.00	267.90	6504.67	209.60 S	7833.22 W	7836.01	1.32
14018.00	90.65	269.34	6504.13	211.89 S	7928.19 W	7931.01	1.66
14113.00	91.82	269.43	6502.08	212.91 S	8023.16 W	8025.97	1.24
14207.00	91.14	269.61	6499.65	213.69 S	8117.12 W	8119.93	0.75
14302.00	90.68	269.06	6498.14	214.80 S	8212.10 W	8214.91	0.75
14397.00	90.03	268.50	6497.56	216.82 S	8307.08 W	8309.90	0.90
14492.00	90.96	268.36	6496.73	219.42 S	8402.04 W	8404.90	0.99
14587.00	89.78	269.11	6496.12	221.52 S	8497.01 W	8499.89	1.47
14682.00	89.45	268.62	6496.76	223.40 S	8591.99 W	8594.89	0.62
14777.00	89.94	268.28	6497.27	225.97 S	8686.95 W	8689.89	0.63
14872.00	89.14	268.64	6498.03	228.52 S	8781.92 W	8784.88	0.92
14966.00	87.72	268.69	6500.60	230.71 S	8875.85 W	8878.85	1.51
15061.00	87.81	268.00	6504.31	233.45 S	8970.74 W	8973.77	0.73
15156.00	87.66	270.14	6508.06	234.99 S	9065.65 W	9068.69	2.26
15251.00	88.03	269.53	6511.64	235.27 S	9160.58 W	9163.60	0.75
15346.00	88.58	269.59	6514.45	236.00 S	9255.54 W	9258.54	0.58
15441.00	88.71	269.29	6516.69	236.93 S	9350.50 W	9353.50	0.34
15536.00	90.52	271.84	6517.33	235.99 S	9445.49 W	9448.43	3.29
15630.00	90.43	269.72	6516.55	234.71 S	9539.47 W	9542.35	2.26
15725.00	91.30	270.01	6515.12	234.93 S	9634.46 W	9637.32	0.97
15820.00	91.60	269.57	6512.71	235.28 S	9729.42 W	9732.27	0.56
15915.00	92.41	269.53	6509.39	236.03 S	9824.36 W	9827.19	0.85
16010.00	92.01	268.13	6505.73	237.97 S	9919.27 W	9922.12	1.53
16105.00	90.40	267.24	6503.73	241.80 S	10014.17 W	10017.08	1.94
16172.00	91.11	267.49	6502.85	244.88 S	10081.09 W	10084.06	1.12
16238.00	91.11	267.49	6501.57	247.77 S	10147.01 W	10150.04	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 DIRECTION OF 268.57 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.57 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16238.00 FEET  
IS 10150.04 FEET ALONG 268.60 DEGREES (GRID)

Final survey is a straight line projection to TD.