HALLIBURTON | Sperry Drilling

PCG Pressure Case Gamma
PCD Pressure Case Directional

Country	: USA
Field	: Wattenberg
Location	: Lat: 40° 27' 4.14" North Long: 104° 21' 22.61" West
Well	: Wells Ranch AE30-62-1AHNA
Company	: Noble
Rig	: H&P 343

Company : **Noble**
Rig : **H&P 343**
Well : **Wells Ranch AE30-62-1AHNA**
Field : **Wattenberg**
Country : **USA**
API Number : **0512338683**

LOCATION
Latitude : **40° 27' 4.14" North**
Longitude : **104° 21' 22.61" West**
UTM Easting = **3,318,288.547 ft**
UTM Northing = **1,409,246.939 ft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level** Elevation : **4747.00 ft**
Log Measured From : **Drill Floor** **24.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

TVD LOG

Elev.	
KB	**NA**
DF	**4771.00 ft**
GL	**4747.00 ft**
WD	**NA**

Depth Logged : **637.99 ft** To **6,504.96 ft**
Date Logged : **12-May-14** To **22-May-14**
Total Depth MD : **16,219.00 ft** TVD: **6,504.96 ft**
Spud Date : **12-May-14**

Unit No. : **11610115** Job No. : **CA-XX-0901136503**
Plot Type : **Final**
Plot Date : **22-May-14**

Borehole Record (TVD)

Run No.	Size	From	To
2	8.750 in	637.99 ft	5,729.97 ft
3	8.750 in	5,729.97 ft	6,423.48 ft

Borehole Record (TVD)

Run No.	Size	From	To

Casing Record (TVD)

Size	Weight	From	To
9.625 in	36.60 lbpf	SURFACE	627.99 ft
7.000 in	34.70 lbpf	SURFACE	6,421.90 ft

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	14-May-14	15-May-14			
Rig Bit Number	2	3			
Bit Size (in)	8.750	8.750			
Tool Nominal OD (in)	6.750	6.750			
Log Start Depth (TVD, ft)	637.99	5,729.97			
Log End Depth (TVD, ft)	5,729.97	6,423.48			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	13-May-14 20:30	15-May-14 02:45			
Drill/Wipe End Date and Time	14-May-14 17:30	16-May-14 14:30			
Min Inc (deg) @ Depth (TVD, ft)	0.28 @ 5,419.99	2.50 @ 5,797.94			
Max Inc (deg) @ Depth (TVD, ft)	8.86 @ 2,304.08	79.01 @ 6,414.00			
Bit TFA(in2) / Bit Type	1.20 / PDC	1.20 / PDC			
Flow Rate (gpm)	597.95	595.00			
Max AV (fpm) / CV (fpm) @ MWD	413.0 / 400.0	417.4 / 400.0			
Fluid Type	Fresh Water Gel	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	8.70 / 26.00	10.60 / 38.00			
Filtrate CL (ppm)	1,400.00	2,700.00			
pH / Fluid Loss (mptm)	8.90 / 9	9.60 / 8			
PV (cP) / YP (lhf2)	1 / 2.00	12 / 12.00			
% Solids / % Sand	2.0 / 0.25	10.9 / 0.10			
% Oil / Oil:Water Ratio	NA / NA	NA / NA			
Rm @ Measured Temp (degF)	N/A @ N/A	NA @ NA			
Rmf @ Measured Temp (degF)	N/A @ N/A	NA @ NA			
Rmc @ Measured Temp (degF)	N/A @ N/A	NA @ NA			
Max Tool Temp (degF) / S[illegible]	[illegible]	[illegible]			

Max Tool Temp (degF) / Source	150.10 / PCM	160.83 / 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-May-14 16:44	01-Jan-70 00:00			
Date and Time Read	15-May-14 23:26	15-May-14 23:54			
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)	338.91	302.93			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.85	49.85			
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

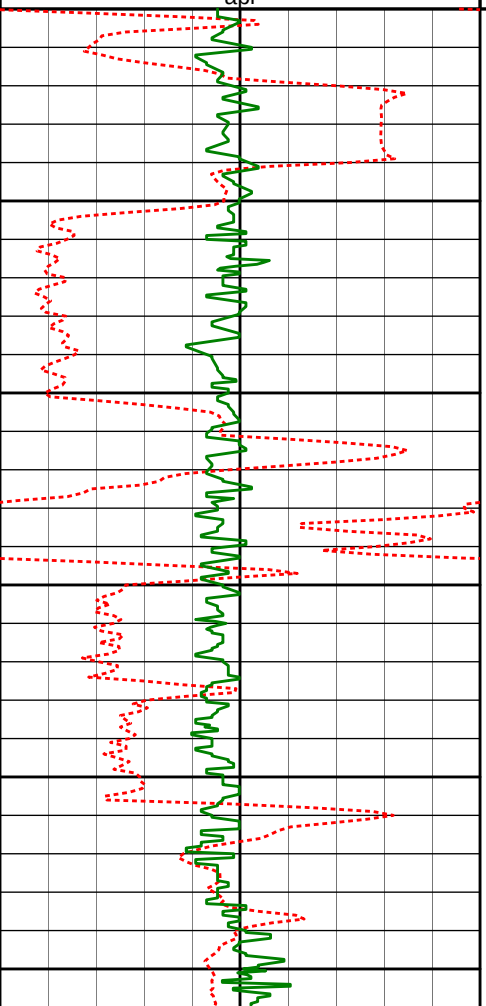
WARRANTY

HALLIBURTON

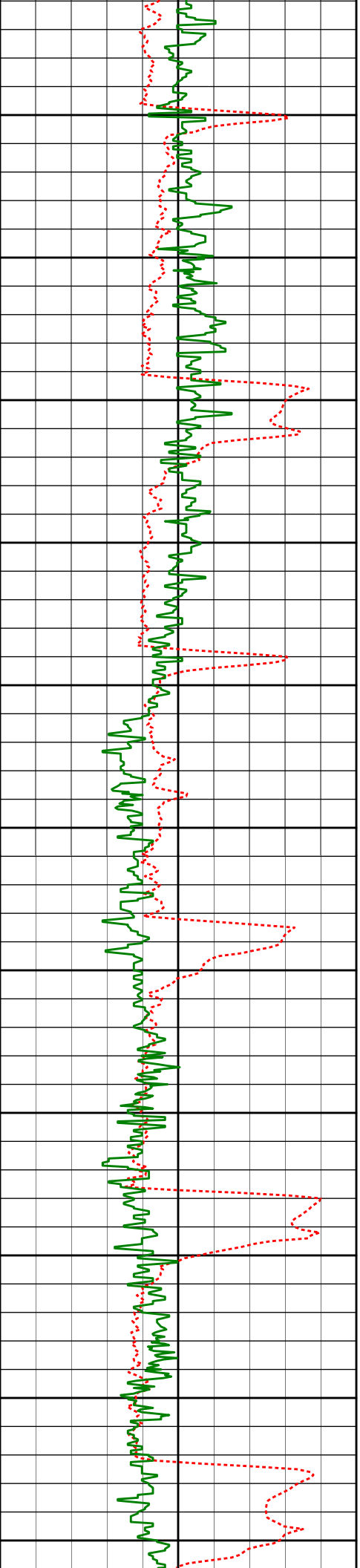
TVD Main Log 1:600

Average Rate of Penetration
ROPA
1K 0
feet per hr

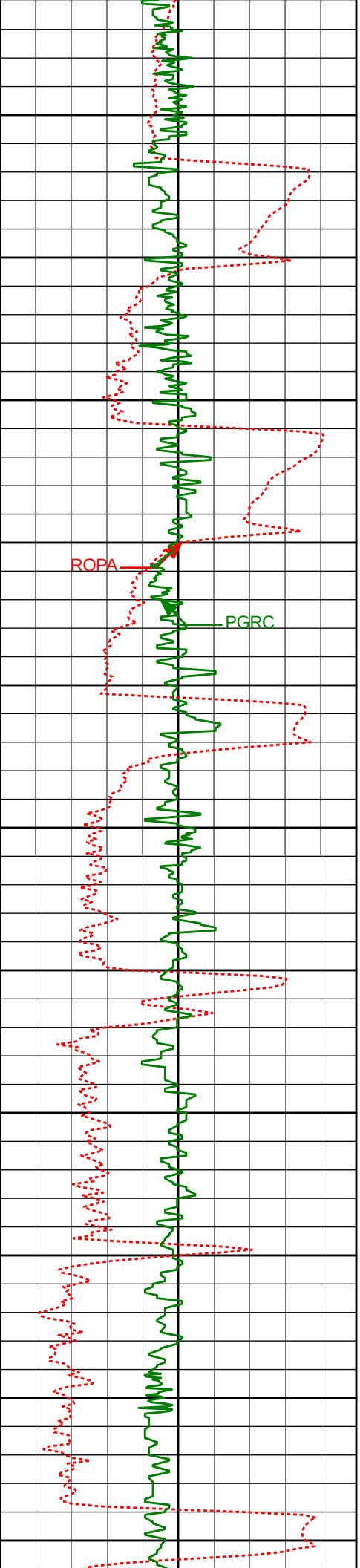
PCG Gamma Ray BCorr
PGRC
0 200
api



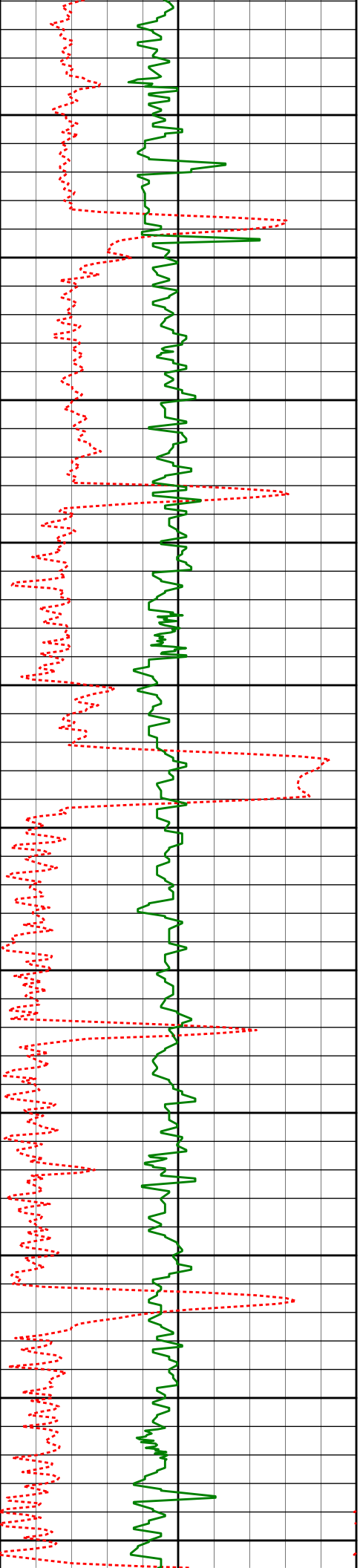
True Vertical Depth (ft) 1:600	Depth	Inc	Azi.	TVD	V.S.
3050'	3066'	6.93°	341.15°	3056.41'	46.10'
3100'					
3150'	3160'	6.85°	344.61°	3149.73'	49.42'
3200'					
3250'	3255'	6.87°	339.91°	3244.06'	52.87'



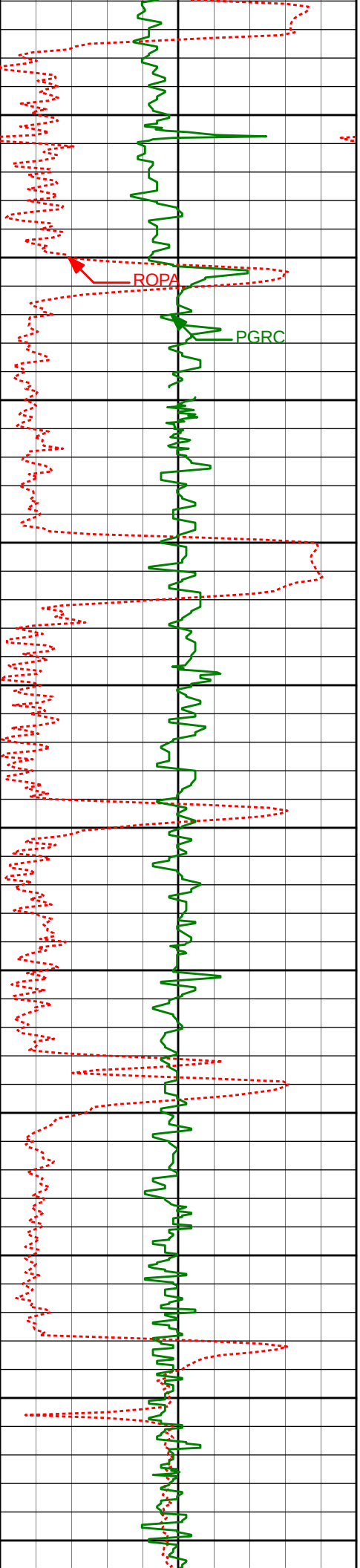
3350'	5.89°	334.00°	3338.47'	56.96'
3445'	6.58°	340.91°	3432.91'	60.88'
3540'	6.52°	343.82°	3527.29'	64.17'
3634'	7.05°	344.17°	3620.63'	67.23'
3729'	6.41°	342.21°	3714.97'	70.44'
3824'	5.59°	335.50°	3809.45'	73.98'



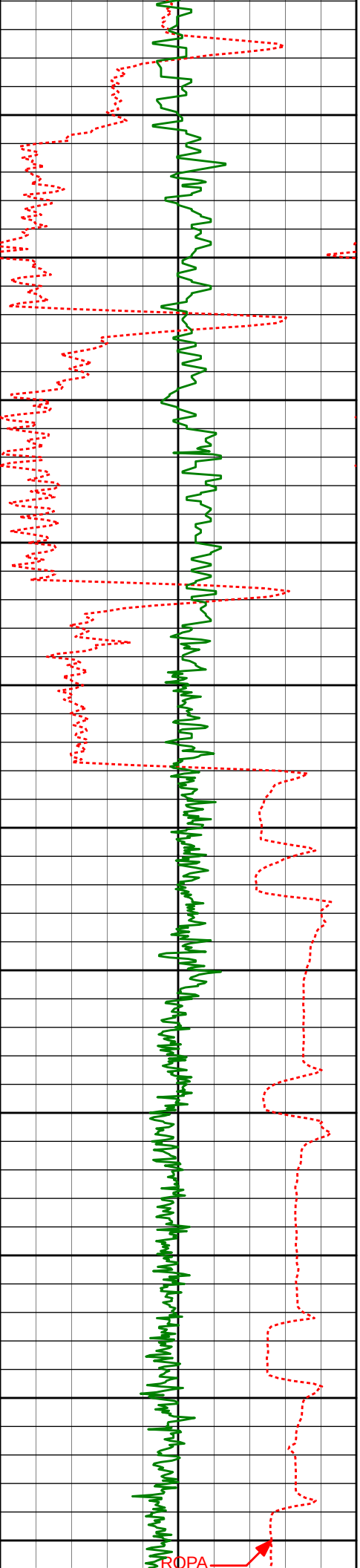
3824'	3.59°	335.50°	3809.45'	75.98'
3850'					
3900'					
3919'	3.49°	317.26°	3904.15'	77.87'
3950'					
4000'					
4014'	0.99°	287.28°	3999.08'	80.61'
4050'					
4100'					
4109'	0.96°	247.65°	4094.06'	82.13'
4150'					
4200'					
4203'	0.93°	212.61°	4188.05'	83.27'
4250'					
4300'					
4298'	0.91°	203.13°	4283.04'	83.98'
4350'					



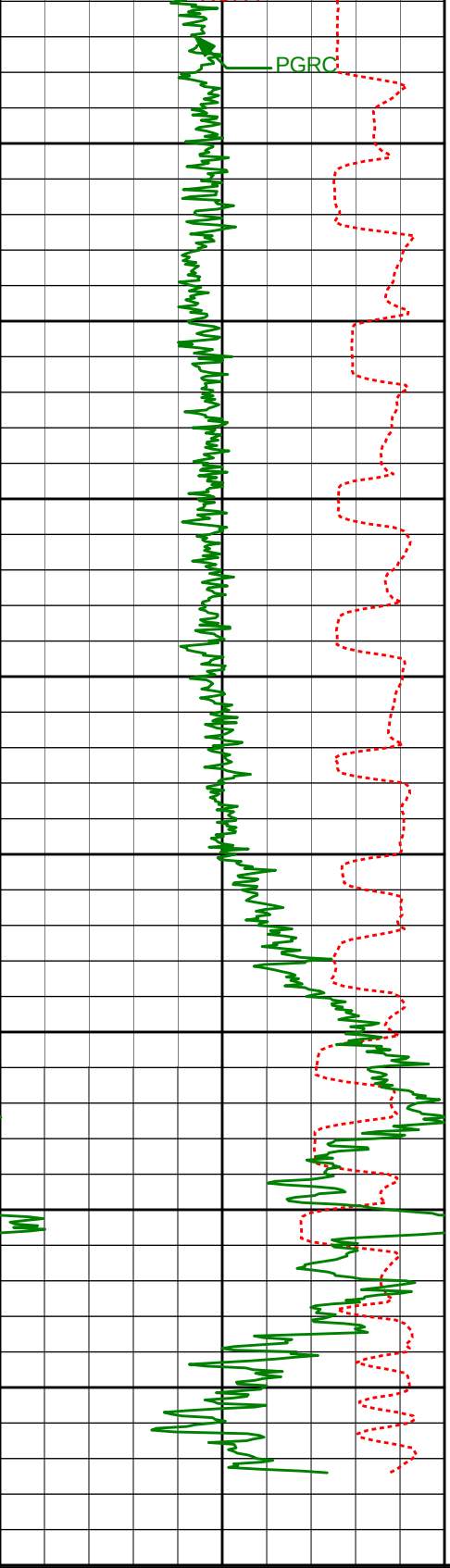
4393'	0.59°	263.50°	4378.03'	84.77'
4488'	0.62°	269.72°	4473.03'	85.77'
4582'	0.50°	260.29°	4567.02'	86.68'
4677'	0.50°	205.19°	4662.02'	87.26'
4772'	0.72°	213.07°	4757.01'	87.77'
4866'	0.68°	205.70°	4851.01'	88.33'



4950'	4961'	0.69°	226.81°	4946.00'	88.99'
5000'					
5050'	5055'	0.47°	251.75°	5039.99'	89.77'
5100'					
5150'	5150'	0.34°	46.57°	5134.99'	89.94'
5200'					
5250'	5245'	0.57°	33.28°	5229.99'	89.47'
5300'					
5350'	5340'	0.36°	70.95°	5324.99'	88.93'
5400'					
5450'	5435'	0.28°	145.59°	5419.99'	88.52'



5530'	0.47°	142.70°	5514.98'	88.15'
5625'	0.69°	171.33°	5609.98'	87.83'
5688'	0.75°	165.48°	5672.98'	87.67'
5718'	0.73°	169.39°	5702.97'	87.58'
5813'	2.50°	250.28°	5797.94'	89.42'
5908'	13.92°	267.42°	5891.82'	102.83'
6002'	22.96°	265.50°	5980.90'	132.47'



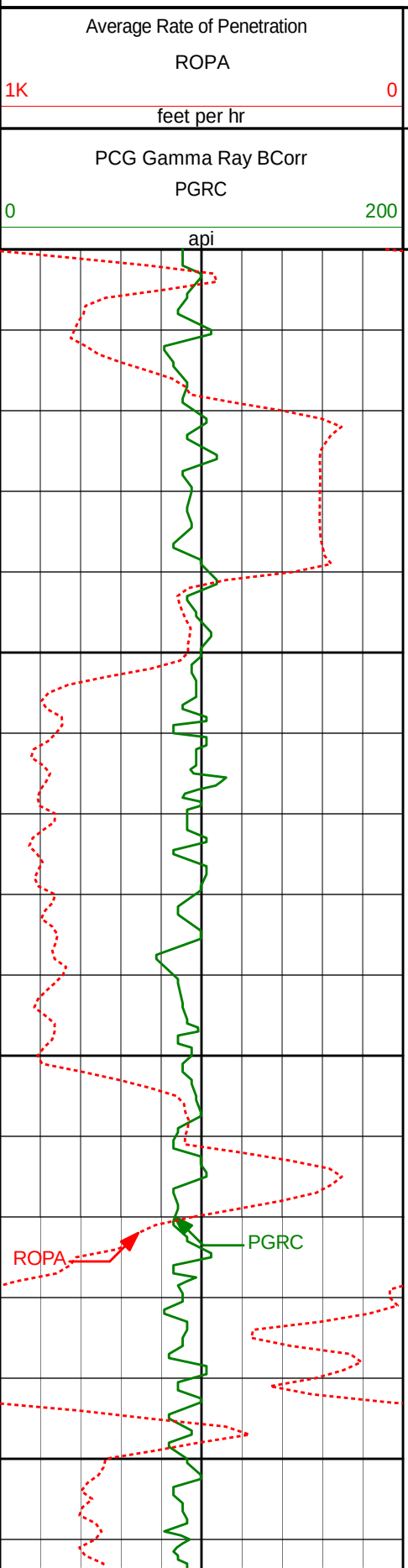
True Vertical Depth (ft) 1:600	Depth	Inc	Azi.	TVD	V.S.
6050'	6050'	23.58°	264.20°	6024.99'	151.35'
6100'	6097'	26.55°	265.61°	6067.56'	171.18'
6150'	6145'	30.14°	266.20°	6109.80'	193.91'
6200'	6192'	34.29°	267.08°	6149.56'	218.92'
6250'	6240'	38.80°	267.54°	6188.11'	247.46'
6300'	6287'	44.81°	267.78°	6223.13'	278.75'
6350'	6335'	49.92°	269.53°	6255.63'	314.04'
6400'	6381'	53.86°	269.07°	6284.02'	350.22'
	6429'	57.48°	268.43°	6311.08'	389.84'
	6476'	60.16°	268.14°	6335.41'	430.03'
	6524'	63.02°	268.24°	6358.25'	472.23'
	6571'	68.87°	270.08°	6377.40'	515.12'
	6619'	72.62°	270.40°	6393.22'	560.42'
	6666'	76.80°	270.71°	6405.62'	605.75'
	6706'	79.01°	270.97°	6414.00'	644.85'
	Casing Shoe @ 6421'				
6450'					

PCG Gamma Ray BCorr
PGRC
0 200
api

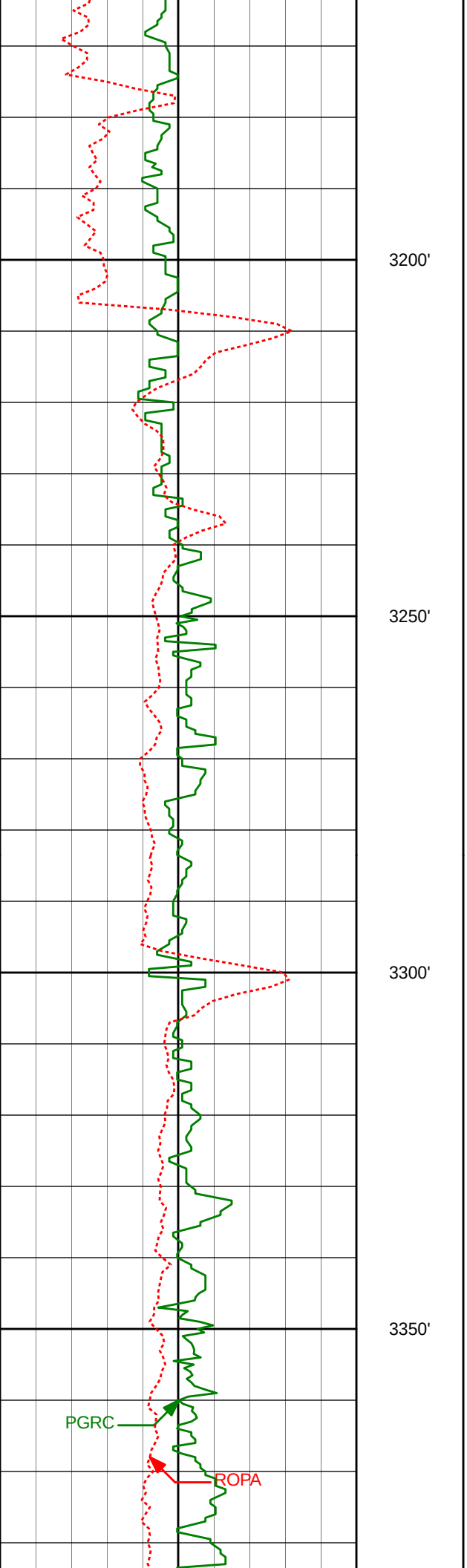
Average Rate of Penetration
ROPA
1K 0
feet per hr

HALLIBURTON

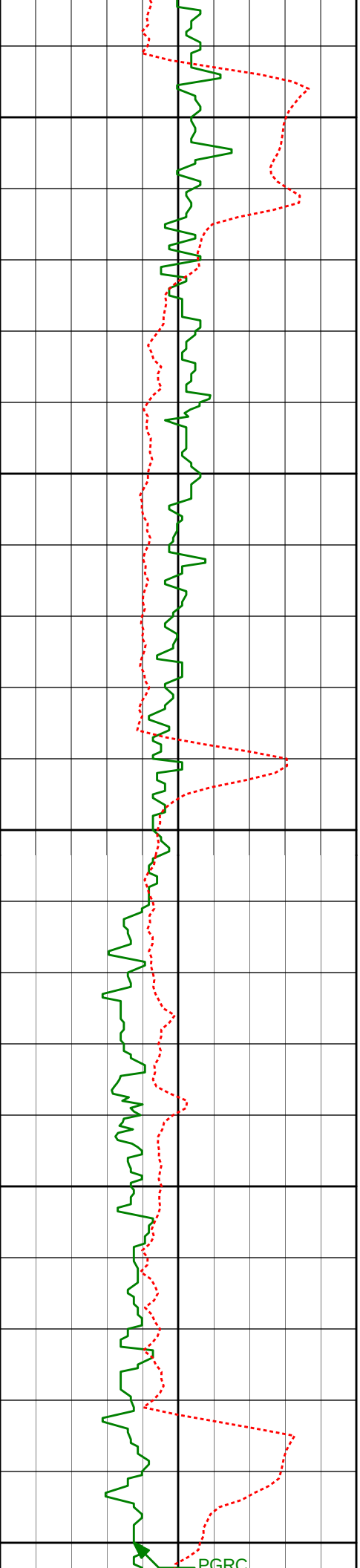
TVD Main Log 1:240



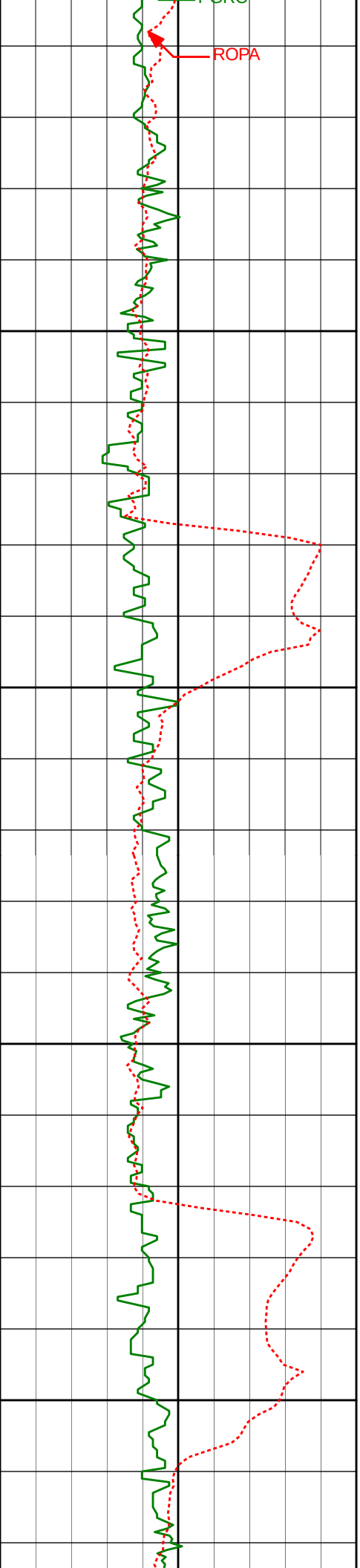
Measured Depth (ft) 1:240	Depth	Inc	Azi.	TVD	V.S.
3050'	3066'	6.93°	341.15°	3056.41'	46.10'
3100'					
3150'	3160'	6.85°	344.61°	3149.73'	49.42'



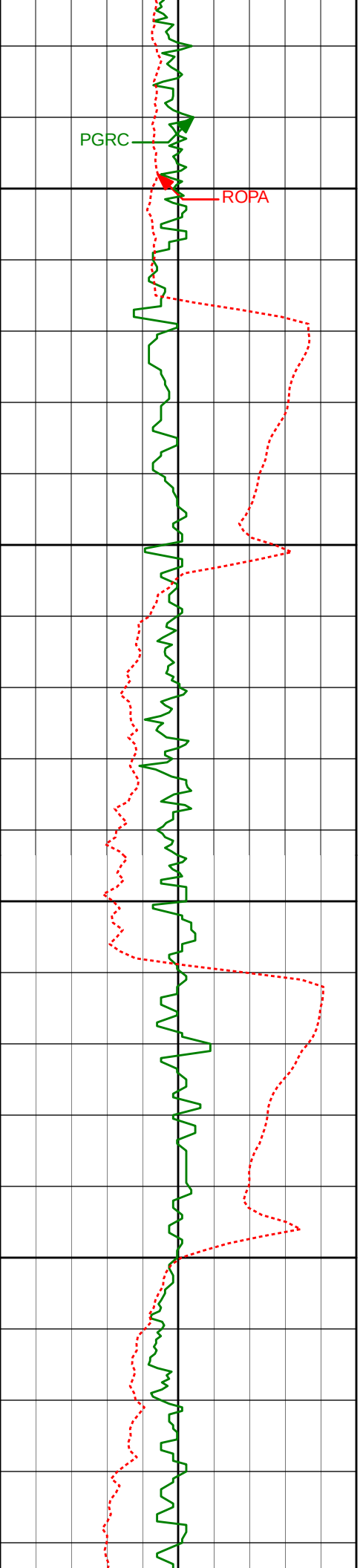
3255'	6.87°	339.91°	3244.06'	52.87'
3350'	5.89°	334.00°	3338.47'	56.96'



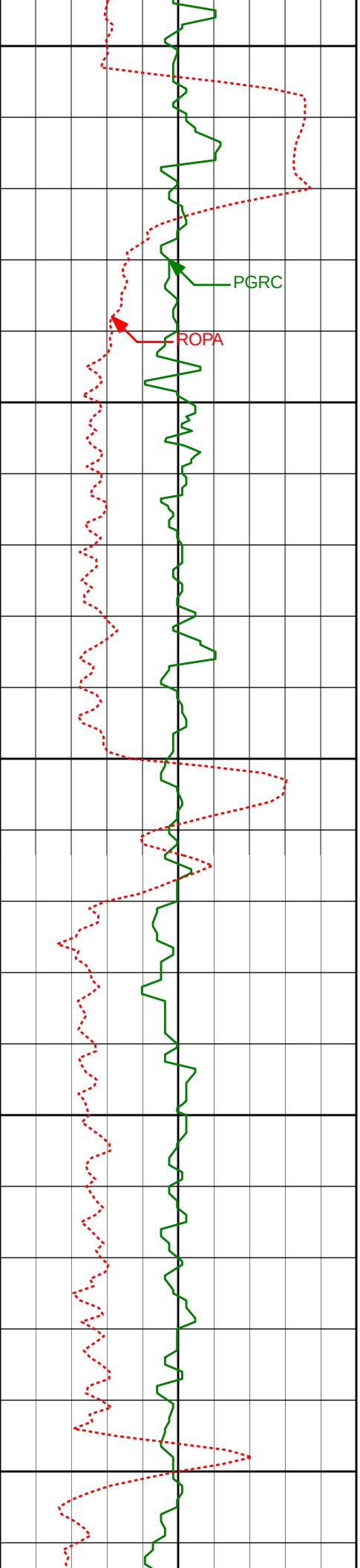
3445'	6.58°	340.91°	3432.91'	60.88'
3540'	6.52°	343.82°	3527.29'	64.17'



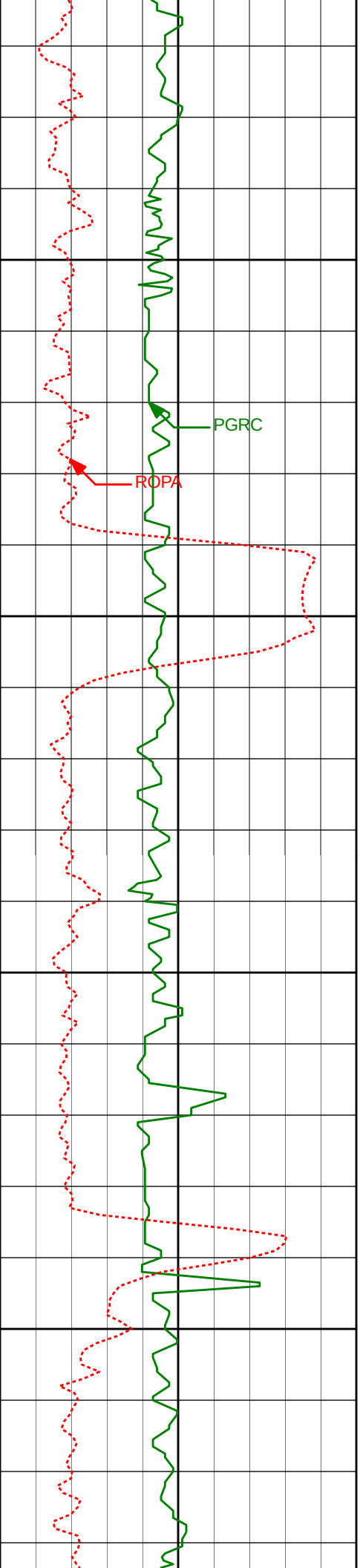
3634'	7.05°	344.17°	3620.63'	67.23'
3729'	6.41°	342.21°	3714.97'	70.44'
3824'	5.59°	335.50°	3809.45'	73.98'



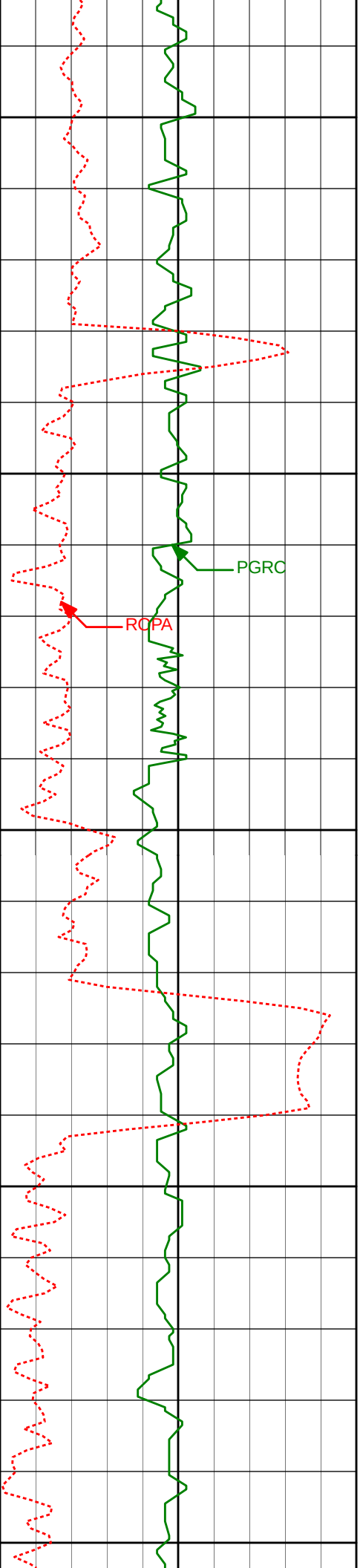
3850'					
3900'	3919'	3.49°	317.26°	3904.15'	77.87'
3950'					
4000'	4014'	0.99°	287.28°	3999.08'	80.61'



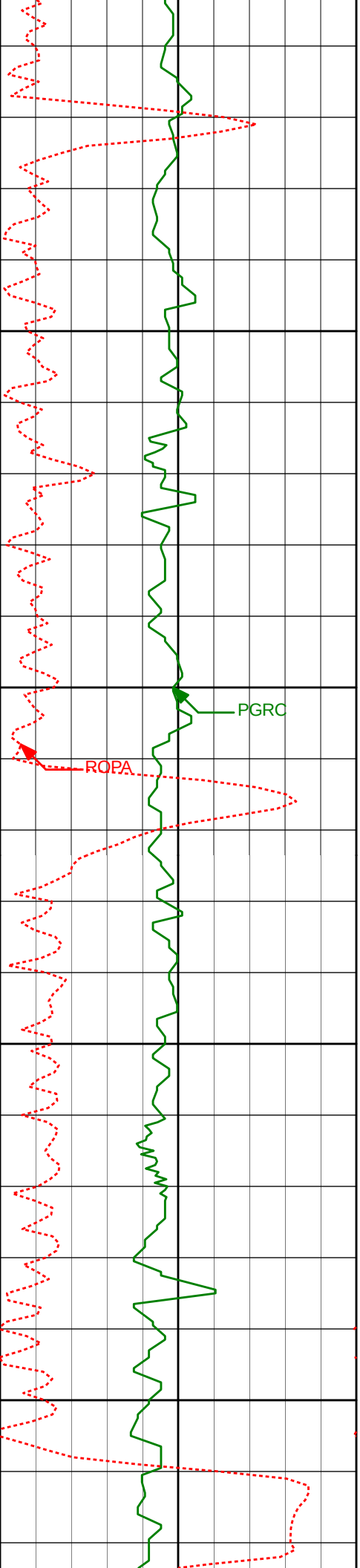
4050'					
	4109'	0.96°	247.65°	4094.06'	82.13'
4100'					
4150'					
	4203'	0.93°	212.61°	4188.05'	83.27'
4200'					
4250'					



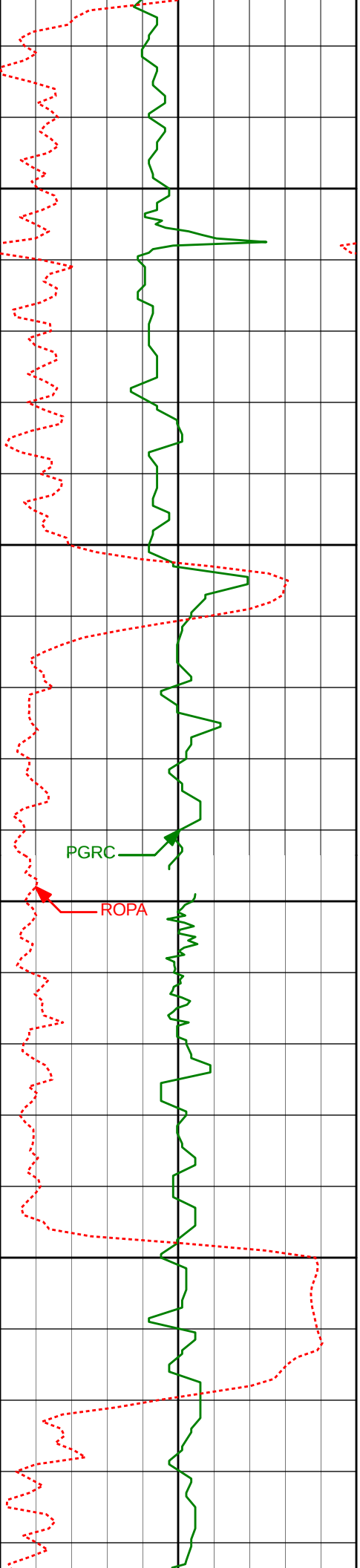
4298'	0.91°	203.13°	4283.04'	83.98'
4300'				
4350'				
4393'	0.59°	263.50°	4378.03'	84.77'
4400'				
4450'				
4488'	0.62°	269.72°	4473.03'	85.77'



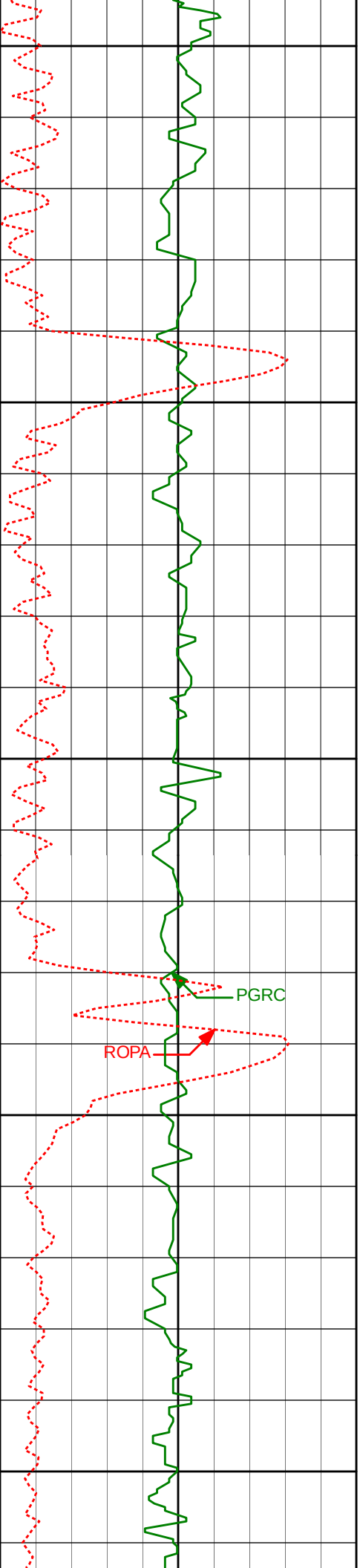
4582'	0.50°	260.29°	4567.02'	86.68'
4677'	0.50°	205.19°	4662.02'	87.26'



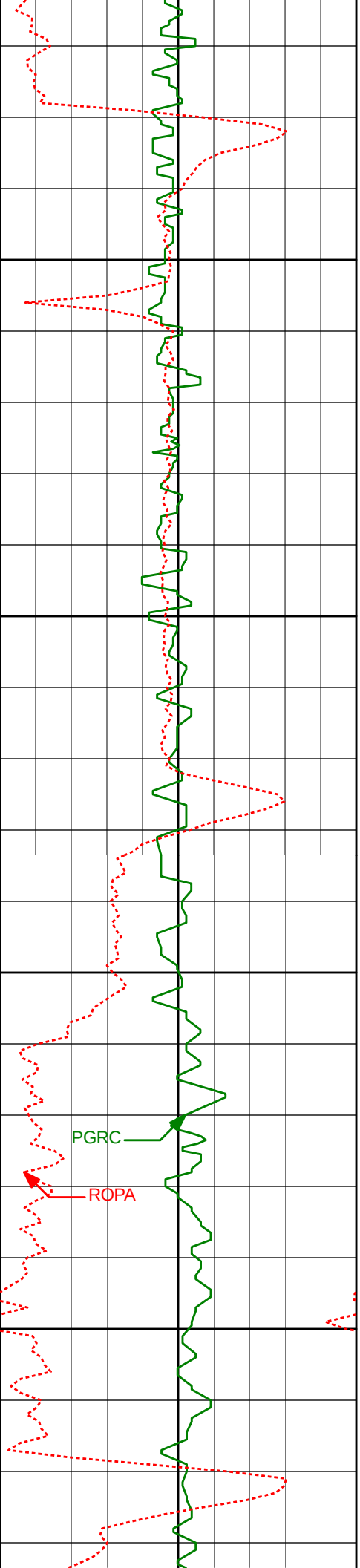
4750'					
	4772'	0.72°	213.07°	4757.01'	87.77'
4800'					
4850'					
	4866'	0.68°	205.70°	4851.01'	88.33'
4900'					



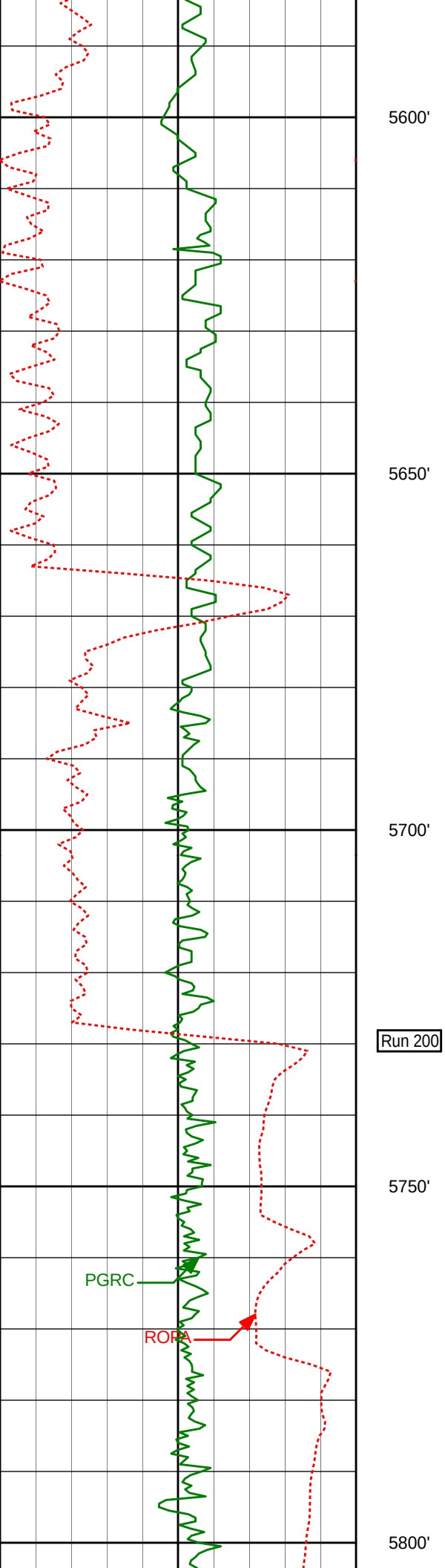
4950'	4961'	0.69°	226.81°	4946.00'	88.99'
5000'				
	5055'	0.47°	251.75°	5039.99'	89.77'
5050'				
5100'				
	5150'	0.34°	46.57°	5134.99'	89.94'



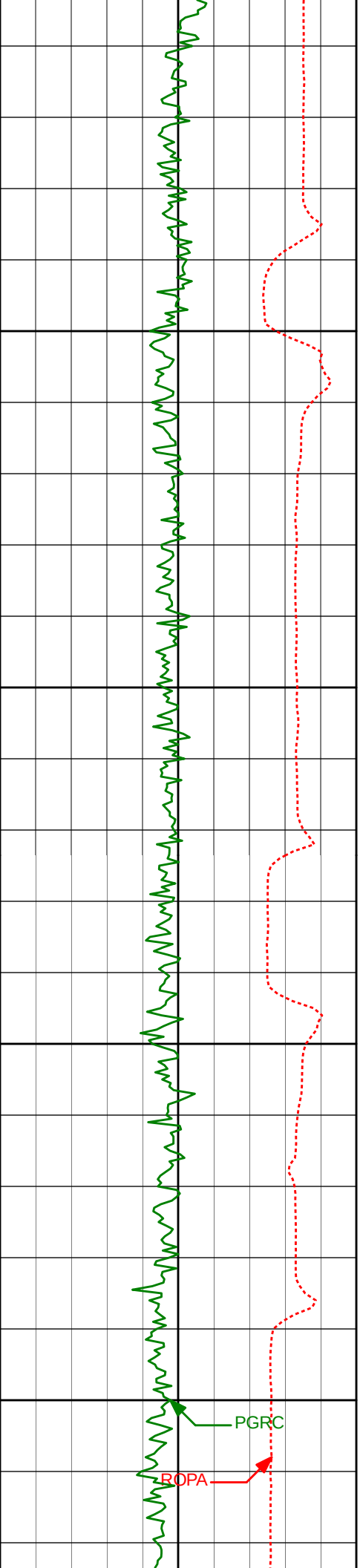
5245'	0.57°	33.28°	5229.99'	89.47'
5340'	0.36°	70.95°	5324.99'	88.93'



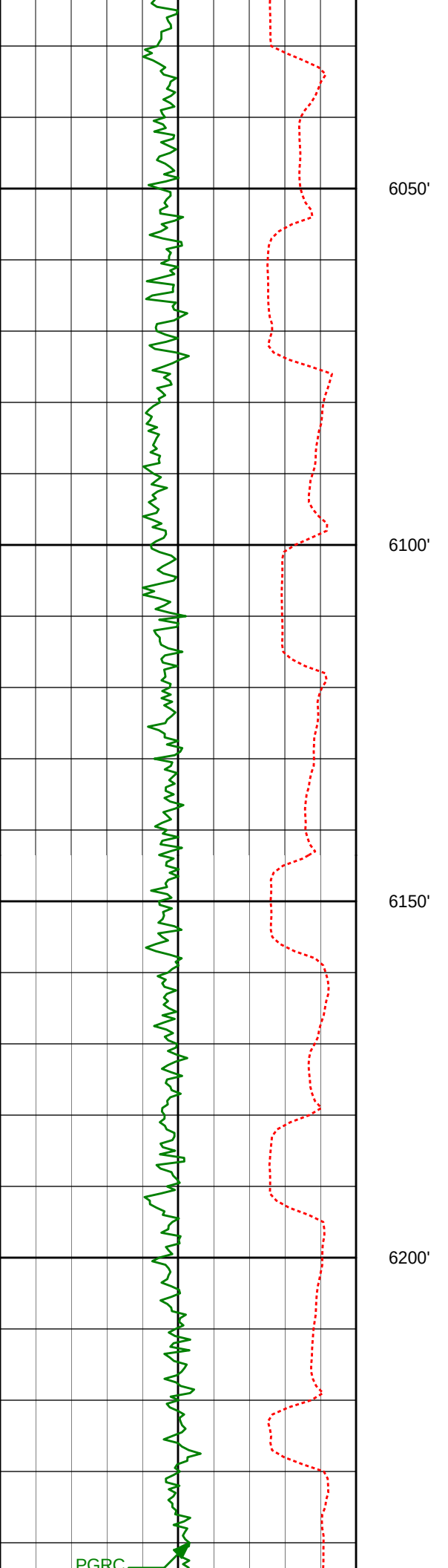
5435'	0.28°	145.59°	5419.99'	88.52'
5530'	0.47°	142.70°	5514.98'	88.15'



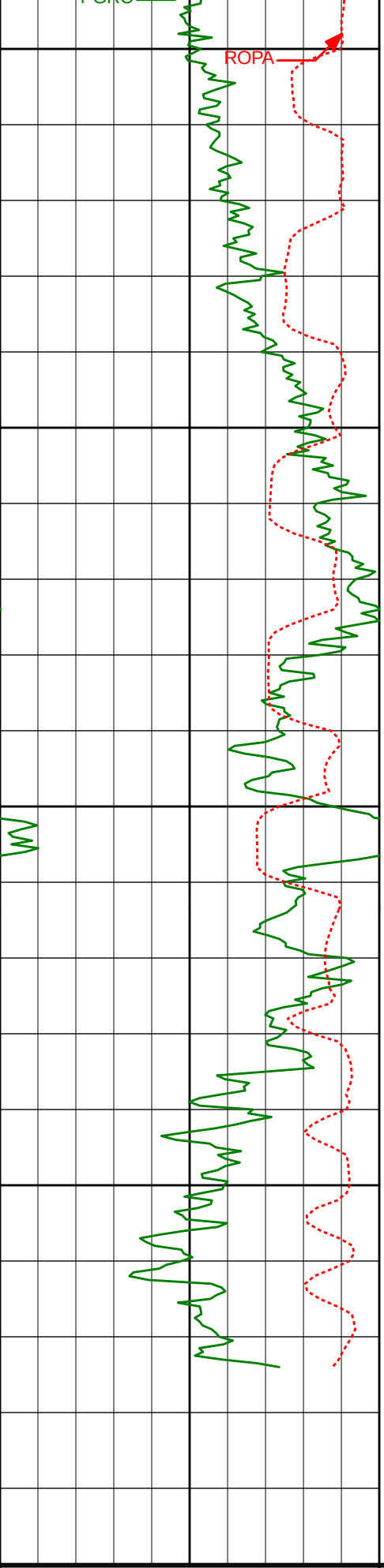
5625'	0.69°	171.33°	5609.98'	87.83'
5688'	0.75°	165.48°	5672.98'	87.67'
5718'	0.73°	169.39°	5702.97'	87.58'
5813'	2.50°	250.28°	5797.94'	89.42'



5908'	13.92°	267.42°	5891.82'	102.83'
6002'	22.96°	265.50°	5980.90'	132.47'



6050'	23.58°	264.20°	6024.99'	151.35'
6097'	26.55°	265.61°	6067.56'	171.18'
6145'	30.14°	266.20°	6109.80'	193.91'
6192'	34.29°	267.08°	6149.56'	218.92'
6240'	38.80°	267.54°	6188.11'	247.46'
6287'	44.81°	267.78°	6223.13'	278.75'



Measured Depth (ft) 1:240	Depth	Inc	Azi.	TVD	V.S.
6250'					
	6335'	49.92°	269.53°	6255.63'	314.04'
	6381'	53.86°	269.07°	6284.02'	350.22'
6300'					
	6429'	57.48°	268.43°	6311.08'	389.84'
	6476'	60.16°	268.14°	6335.41'	430.03'
6350'					
	6524'	63.02°	268.24°	6358.25'	472.23'
	6571'	68.87°	270.08°	6377.40'	515.12'
	6619'	72.62°	270.40°	6393.22'	560.42'
6400'					
	6666'	76.80°	270.71°	6405.62'	605.75'
	6706'	79.01°	270.97°	6414.00'	644.85'
	Casing Shoe @ 6421'				
6450'					

PCG Gamma Ray BCorr
PGRC
0 200

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

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble
Wells Ranch AE30-62-1AHNA
Wattenberg
Weld Colorado
USA
CA-XX-0901136503
The first two surveys at 360' and 603' 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
360.00	0.50	249.38	360.00	0.55 S	1.47 W	1.47	0.14
603.00	0.60	58.38	602.99	0.26 S	1.38 W	1.38	0.45
807.00	1.02	62.55	806.97	1.14 N	1.14 E	-1.14	0.21
991.00	1.40	70.61	990.93	2.64 N	4.72 E	-4.71	0.23
1176.00	1.11	74.54	1175.88	3.87 N	8.57 E	-8.57	0.16
1269.00	0.97	66.17	1268.87	4.42 N	10.16 E	-10.16	0.22
1362.00	0.99	73.22	1361.86	4.97 N	11.65 E	-11.65	0.13
1456.00	0.85	1.19	1455.85	5.91 N	12.44 E	-12.44	1.16
1549.00	0.76	354.36	1548.84	7.21 N	12.40 E	-12.40	0.14
1737.00	0.93	347.01	1736.82	9.94 N	11.93 E	-11.93	0.11
1832.00	0.79	335.50	1831.81	11.28 N	11.49 E	-11.49	0.23
1927.00	0.51	331.45	1926.80	12.25 N	11.01 E	-11.01	0.30
2022.00	1.92	326.45	2021.78	13.95 N	9.93 E	-9.93	1.49
2117.00	4.98	326.58	2116.59	18.72 N	6.78 E	-6.78	3.22
2212.00	7.44	339.58	2211.03	27.93 N	2.36 E	-2.36	2.97
2306.00	8.86	341.51	2304.08	40.50 N	2.06 W	2.06	1.54
2401.00	8.50	338.07	2397.99	53.95 N	7.00 W	7.01	0.66
2496.00	8.10	337.45	2492.00	66.64 N	12.19 W	12.20	0.43
2591.00	7.80	336.98	2586.09	78.76 N	17.28 W	17.29	0.32
2686.00	7.94	337.27	2680.19	90.74 N	22.33 W	22.35	0.15
2781.00	8.19	334.55	2774.25	102.90 N	27.77 W	27.79	0.48
2876.00	8.64	332.66	2868.23	115.35 N	33.96 W	33.98	0.56
2971.00	8.07	328.43	2962.22	127.37 N	40.73 W	40.75	0.88
3066.00	6.93	341.15	3056.41	138.48 N	46.07 W	46.10	2.11
3160.00	6.85	344.61	3149.73	149.25 N	49.39 W	49.42	0.45
3255.00	6.87	339.91	3244.06	160.05 N	52.85 W	52.87	0.59
3350.00	5.89	334.00	3338.47	169.76 N	56.94 W	56.96	1.24
3445.00	6.58	340.91	3432.91	179.29 N	60.85 W	60.88	1.07
3540.00	6.52	343.82	3527.29	189.61 N	64.14 W	64.17	0.36
3634.00	7.05	344.17	3620.63	200.29 N	67.20 W	67.23	0.57
3729.00	6.41	342.21	3714.97	210.95 N	70.41 W	70.44	0.72
3824.00	5.59	335.50	3809.45	220.21 N	73.95 W	73.98	1.13
3919.00	3.49	317.26	3904.15	226.54 N	77.83 W	77.87	2.66
4014.00	0.99	287.28	3999.08	228.91 N	80.57 W	80.61	2.82
4109.00	0.96	247.65	4094.06	228.85 N	82.09 W	82.13	0.70
4203.00	0.93	212.61	4188.05	227.91 N	83.23 W	83.27	0.61
4298.00	0.91	203.13	4283.04	226.57 N	83.95 W	83.98	0.16
4393.00	0.59	263.50	4378.03	225.82 N	84.73 W	84.77	0.85
4488.00	0.62	269.72	4473.03	225.76 N	85.73 W	85.77	0.08
4582.00	0.50	260.29	4567.02	225.69 N	86.64 W	86.68	0.16
4677.00	0.50	205.19	4662.02	225.24 N	87.23 W	87.26	0.49
4772.00	0.72	213.07	4757.01	224.37 N	87.73 W	87.77	0.25
4866.00	0.68	205.70	4851.01	223.37 N	88.29 W	88.33	0.10
4961.00	0.69	226.81	4946.00	222.47 N	88.95 W	88.99	0.26
5055.00	0.47	251.75	5039.99	221.96 N	89.73 W	89.77	0.35
5150.00	0.34	46.57	5134.99	222.03 N	89.90 W	89.94	0.83
5245.00	0.57	33.28	5229.99	222.62 N	89.43 W	89.47	0.26
5340.00	0.36	70.95	5324.99	223.12 N	88.89 W	88.93	0.38
5435.00	0.28	145.59	5419.99	223.02 N	88.48 W	88.52	0.41

5530.00	0.47	142.70	5514.98	222.52 N	88.11 W	88.15	0.20
5625.00	0.69	171.33	5609.98	221.64 N	87.79 W	87.83	0.38
5688.00	0.75	165.48	5672.98	220.87 N	87.63 W	87.67	0.15
5718.00	0.73	169.39	5702.97	220.49 N	87.54 W	87.58	0.18
5813.00	2.50	250.28	5797.94	219.20 N	89.38 W	89.42	2.62
5908.00	13.92	267.42	5891.82	217.98 N	102.79 W	102.83	12.16
6002.00	22.96	265.50	5980.90	216.03 N	132.43 W	132.47	9.64
6050.00	23.58	264.20	6024.99	214.32 N	151.31 W	151.35	1.68
6097.00	26.55	265.61	6067.56	212.57 N	171.14 W	171.18	6.45
6145.00	30.14	266.20	6109.80	210.95 N	193.87 W	193.91	7.50
6192.00	34.29	267.08	6149.56	209.49 N	218.88 W	218.92	8.89
6240.00	38.80	267.54	6188.11	208.16 N	247.42 W	247.46	9.41
6287.00	44.81	267.78	6223.13	206.88 N	278.71 W	278.75	12.79
6335.00	49.92	269.53	6255.63	206.08 N	314.00 W	314.04	10.98
6381.00	53.86	269.07	6284.02	205.63 N	350.19 W	350.22	8.60
6429.00	57.48	268.43	6311.08	204.76 N	389.81 W	389.84	7.62
6476.00	60.16	268.14	6335.41	203.56 N	430.00 W	430.03	5.73
6524.00	63.02	268.24	6358.25	202.22 N	472.19 W	472.23	5.96
6571.00	68.87	270.08	6377.40	201.61 N	515.08 W	515.12	12.95
6619.00	72.62	270.40	6393.22	201.80 N	560.39 W	560.42	7.84
6666.00	76.80	270.71	6405.62	202.24 N	605.71 W	605.75	8.92
6706.00	79.01	270.97	6414.00	202.81 N	644.82 W	644.85	5.56
6843.00	84.29	270.52	6433.89	204.57 N	780.31 W	780.34	3.87
6937.00	85.28	270.37	6442.43	205.30 N	873.91 W	873.95	1.07
7032.00	87.13	268.99	6448.72	204.77 N	968.70 W	968.73	2.43
7127.00	87.13	268.31	6453.47	202.53 N	1063.55 W	1063.59	0.71
7222.00	87.07	267.57	6458.28	199.12 N	1158.37 W	1158.40	0.78
7317.00	89.14	267.71	6461.42	195.21 N	1253.23 W	1253.26	2.18
7412.00	90.83	267.86	6461.45	191.54 N	1348.16 W	1348.19	1.79
7506.00	89.20	268.43	6461.42	188.50 N	1442.10 W	1442.14	1.84
7601.00	90.46	269.77	6461.70	187.01 N	1537.09 W	1537.12	1.94
7696.00	89.11	267.49	6462.06	184.74 N	1632.05 W	1632.08	2.79
7791.00	90.18	268.93	6462.65	181.77 N	1727.00 W	1727.03	1.89
7886.00	89.07	267.91	6463.27	179.15 N	1821.96 W	1821.99	1.59
7980.00	91.02	270.04	6463.20	177.47 N	1915.93 W	1915.96	3.07
8075.00	91.39	269.56	6461.20	177.14 N	2010.91 W	2010.94	0.64
8169.00	91.69	268.47	6458.67	175.52 N	2104.86 W	2104.89	1.20
8264.00	91.08	269.72	6456.38	174.02 N	2199.82 W	2199.85	1.46
8359.00	90.68	269.47	6454.92	173.35 N	2294.81 W	2294.84	0.50
8454.00	89.51	270.08	6454.76	172.98 N	2389.80 W	2389.83	1.39
8548.00	89.63	273.70	6455.47	176.08 N	2483.73 W	2483.76	3.85
8643.00	89.97	276.90	6455.80	184.85 N	2578.31 W	2578.35	3.39
8738.00	89.85	275.27	6455.95	194.92 N	2672.77 W	2672.81	1.72
8833.00	86.14	270.24	6459.27	199.49 N	2767.56 W	2767.59	6.58
8927.00	87.41	269.75	6464.56	199.48 N	2861.41 W	2861.44	1.45
9022.00	87.66	267.87	6468.65	197.51 N	2956.30 W	2956.33	1.99
9117.00	87.44	267.36	6472.71	193.56 N	3051.13 W	3051.16	0.58
9212.00	88.09	266.59	6476.41	188.55 N	3145.92 W	3145.95	1.06
9307.00	89.41	267.80	6478.48	183.90 N	3240.78 W	3240.81	1.88
9402.00	90.00	267.82	6478.97	180.27 N	3335.71 W	3335.74	0.62
9496.00	90.49	267.49	6478.57	176.42 N	3429.63 W	3429.66	0.63
9590.00	88.31	265.01	6479.56	170.28 N	3523.41 W	3523.44	3.51
9685.00	90.93	268.18	6480.19	164.64 N	3618.22 W	3618.25	4.33
9779.00	90.62	267.69	6478.92	161.25 N	3712.15 W	3712.18	0.62
9873.00	90.25	266.78	6478.20	156.71 N	3806.04 W	3806.06	1.05
9968.00	89.44	267.26	6478.46	151.78 N	3900.91 W	3900.93	0.99
10062.00	89.91	267.55	6478.99	147.52 N	3994.81 W	3994.83	0.59
10162.00	89.48	266.34	6479.52	142.19 N	4094.66 W	4094.69	1.28
10257.00	89.69	268.01	6480.21	137.51 N	4189.54 W	4189.57	1.77
10352.00	89.75	267.60	6480.68	133.87 N	4284.47 W	4284.49	0.44
10445.00	89.82	269.17	6481.03	131.25 N	4377.43 W	4377.45	1.69
10538.00	89.38	267.46	6481.67	128.51 N	4470.38 W	4470.41	1.90
10629.00	90.03	269.30	6482.14	125.94 N	4561.34 W	4561.36	2.14
10721.00	89.48	268.65	6482.54	124.30 N	4653.33 W	4653.35	0.93
10814.00	90.28	270.05	6482.73	123.24 N	4746.32 W	4746.34	1.73
10906.00	89.14	268.10	6483.20	121.76 N	4838.30 W	4838.32	2.46
10999.00	91.36	270.47	6482.79	120.60 N	4931.28 W	4931.30	3.49
11092.00	90.15	270.49	6481.57	121.37 N	5024.26 W	5024.28	1.30
11184.00	89.48	269.02	6481.86	120.98 N	5116.26 W	5116.28	1.76
11276.00	90.15	268.94	6482.16	119.34 N	5208.24 W	5208.26	0.73
11369.00	89.75	267.81	6482.24	116.71 N	5301.20 W	5301.22	1.29
11461.00	90.22	269.56	6482.27	114.59 N	5393.18 W	5393.20	1.97
11554.00	90.40	270.05	6481.76	114.28 N	5486.17 W	5486.19	0.56
11647.00	89.01	269.70	6482.24	114.07 N	5579.17 W	5579.19	1.54

11741.00	89.08	268.89	6483.81	112.92 N	5673.15 W	5673.17	0.86
11834.00	90.28	268.78	6484.33	111.03 N	5766.13 W	5766.15	1.30
11927.00	90.49	268.02	6483.70	108.43 N	5859.09 W	5859.11	0.85
12022.00	87.93	266.13	6485.01	103.58 N	5953.94 W	5953.96	3.35
12117.00	89.04	267.01	6487.52	97.90 N	6048.74 W	6048.75	1.49
12212.00	88.61	268.04	6489.47	93.80 N	6143.63 W	6143.64	1.17
12307.00	88.58	267.06	6491.80	89.74 N	6238.51 W	6238.53	1.03
12402.00	88.77	267.83	6494.00	85.51 N	6333.39 W	6333.40	0.83
12497.00	90.12	269.94	6494.92	83.66 N	6428.36 W	6428.37	2.64
12592.00	89.01	268.56	6495.64	82.42 N	6523.35 W	6523.36	1.86
12687.00	89.81	268.77	6496.62	80.20 N	6618.31 W	6618.33	0.87
12781.00	90.18	269.56	6496.63	78.83 N	6712.30 W	6712.32	0.93
12876.00	90.46	268.94	6496.10	77.59 N	6807.29 W	6807.31	0.72
12971.00	90.74	267.22	6495.10	74.41 N	6902.23 W	6902.24	1.83
13066.00	91.67	269.12	6493.10	71.37 N	6997.16 W	6997.17	2.23
13161.00	91.29	269.08	6490.65	69.88 N	7092.11 W	7092.12	0.40
13256.00	90.56	269.19	6489.12	68.45 N	7187.09 W	7187.10	0.78
13351.00	89.75	268.97	6488.86	66.92 N	7282.07 W	7282.09	0.88
13446.00	89.14	270.00	6489.78	66.07 N	7377.06 W	7377.08	1.26
13540.00	89.17	269.28	6491.17	65.48 N	7471.05 W	7471.06	0.77
13635.00	89.97	269.49	6491.88	64.46 N	7566.04 W	7566.05	0.87
13730.00	90.83	269.58	6491.22	63.69 N	7661.04 W	7661.05	0.91
13825.00	89.69	269.37	6490.78	62.82 N	7756.03 W	7756.04	1.22
13919.00	88.49	269.46	6492.28	61.86 N	7850.01 W	7850.02	1.28
14014.00	88.52	268.26	6494.76	59.97 N	7944.96 W	7944.97	1.26
14109.00	88.34	267.17	6497.36	56.18 N	8039.85 W	8039.86	1.16
14204.00	89.29	267.35	6499.32	51.64 N	8134.72 W	8134.72	1.02
14299.00	89.54	268.71	6500.29	48.38 N	8229.65 W	8229.66	1.46
14394.00	89.97	270.38	6500.70	47.62 N	8324.64 W	8324.65	1.82
14489.00	88.95	268.21	6501.60	46.45 N	8419.63 W	8419.63	2.52
14584.00	88.86	268.21	6503.41	43.49 N	8514.56 W	8514.57	0.09
14678.00	90.03	268.91	6504.32	41.12 N	8608.53 W	8608.53	1.45
14773.00	90.31	269.01	6504.04	39.40 N	8703.51 W	8703.52	0.31
14868.00	90.37	267.93	6503.48	36.86 N	8798.47 W	8798.48	1.14
14963.00	91.11	268.29	6502.25	33.73 N	8893.41 W	8893.42	0.87
15058.00	90.31	269.06	6501.07	31.53 N	8988.38 W	8988.38	1.17
15153.00	88.40	268.80	6502.14	29.76 N	9083.35 W	9083.36	2.03
15248.00	88.46	268.27	6504.74	27.33 N	9178.28 W	9178.29	0.56
15343.00	88.43	267.68	6507.32	23.98 N	9273.19 W	9273.19	0.62
15437.00	88.89	268.02	6509.52	20.45 N	9367.10 W	9367.10	0.61
15532.00	89.48	268.20	6510.87	17.32 N	9462.04 W	9462.04	0.65
15627.00	90.00	270.25	6511.30	16.03 N	9557.02 W	9557.02	2.23
15722.00	90.93	268.39	6510.53	14.90 N	9652.01 W	9652.01	2.19
15817.00	90.59	269.10	6509.27	12.82 N	9746.97 W	9746.98	0.83
15912.00	90.28	268.35	6508.55	10.71 N	9841.95 W	9841.95	0.85
16007.00	90.65	267.56	6507.78	7.32 N	9936.88 W	9936.88	0.92
16101.00	90.86	266.84	6506.54	2.73 N	10030.76 W	10030.76	0.80
16154.00	90.74	265.64	6505.80	0.75 S	10083.64 W	10083.64	2.28
16219.00	90.74	265.64	6504.96	5.69 S	10148.45 W	10148.45	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 270.01 DEGREES (GRID)
A TOTAL CORRECTION OF 7.43 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16219.00 FEET
IS 10148.45 FEET ALONG 269.97 DEGREES (GRID)

Final survey is a straight line projection to TD.

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