

**PCGC - Pressure Case Gamma**  
**PCDC - Pressure Case Directional**

**1:240 / 1:600**

[illegible]

## WELL INFORMATION

MWD Run Number	100				
Date run completed	28-Jan-16				
Rig Bit Number	2				
Bit Size (in)	8.750				
Tool Nominal OD (in)	6.750				
Log Start Depth (TVD, ft)	618.00				
Log End Depth (TVD, ft)	5,942.89				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	26-Jan-16 15:00:16				
Drill/Wipe End Date and Time	28-Jan-16 15:00:16				
Min Inc (deg) @ Depth (TVD, ft)	0.17 @ 618.00				
Max Inc (deg) @ Depth (TVD, ft)	80.25 @ 5,935.88				
Bit TFA(in2) / Bit Type	1.05 / PDC				
Flow Rate (gpm)	576.35				
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A				
Fluid Type	Native/Spud Mud				
Density (ppg) / Viscosity (spqt)	10.35 / 42.00				
Filtrate CL (ppm)	1,700.00				
pH / Fluid Loss (mptm)	9.50 / 7				
PV (cP) / YP (lbf2)	10 / 11.00				
% Solids / % Sand	9.80 / 0.30				
% Oil / Oil:Water Ratio	N/A / N/A				
Rm @ Measured Temp (degF)	N/A @ N/A				
Rmf @ Measured Temp (degF)	N/A @ N/A				
Rmc @ Measured Temp (degF)	N/A @ N/A				
Max Tool Temp (degF) / S	100.00 / PDC				

Max Tool Temp (degF) / Source	160.83 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ N/A				
Lead MWD Engineer	Adam Sampson				
Customer Representative	Justin Fields				

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM				
Software Version	5.93				
Sub Serial Number	11341339				
Insert Serial Number	11227541				
Date and Time Initialized	26-Jan-16 18:06				
Date and Time Read	28-Jan-16 13:24				
ECMB SW Version	N/A				

### Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	55.00				
Software Version	6.33				
Sub Serial Number	11341339				
Sonde Serial Number	11297563				
Sensor ID Number	N/A				
Toolface Offset (deg)	334.52				

### Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	42.46				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11341339				
Insert/Sonde Serial Number	12071507				

## REMARKS

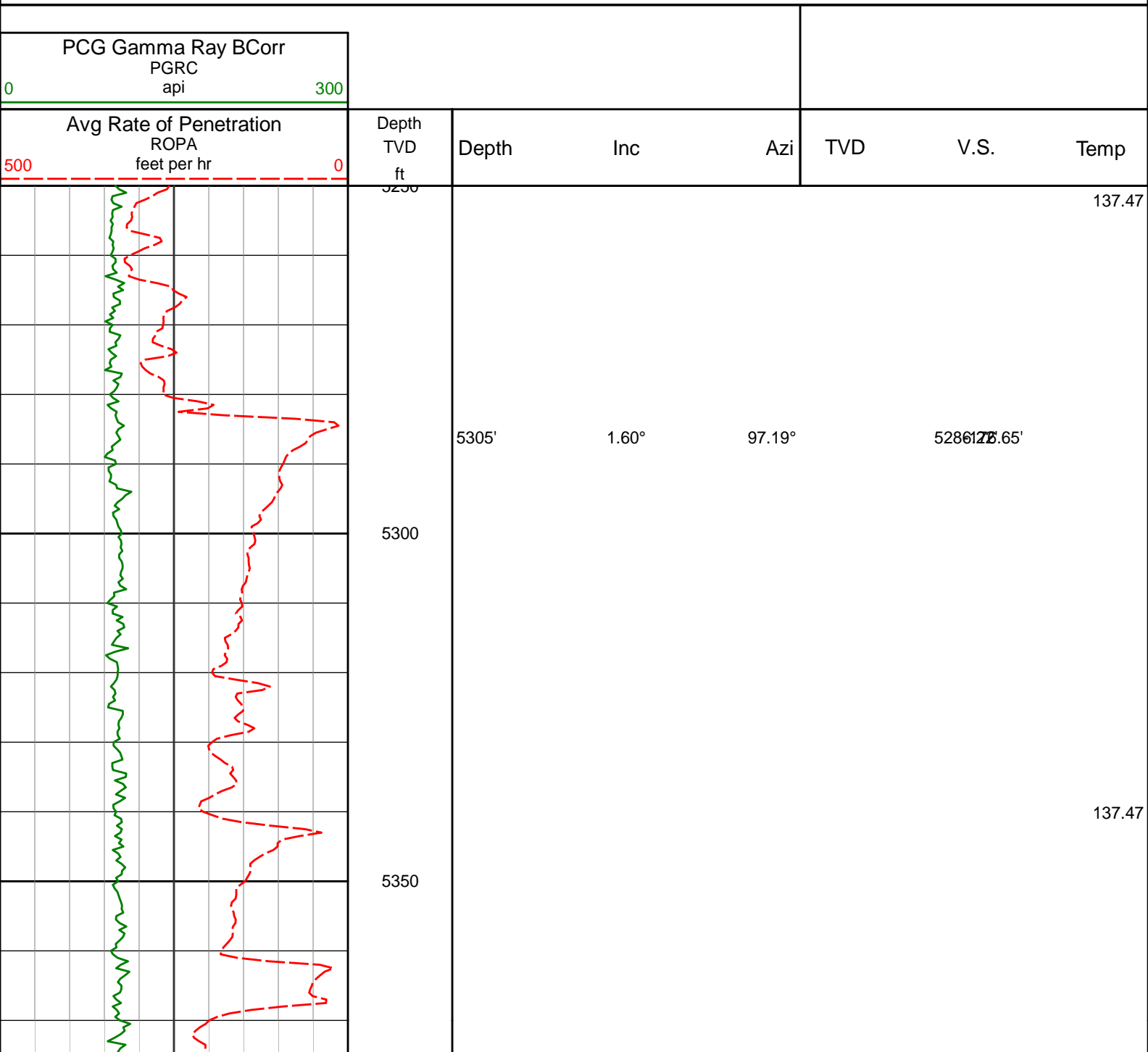
1. All depths are calibrated to the driller's pipe tally and are measured from the Rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
  - ROPA: Average Rate of Penetration is real time data.
  - PGRC: Smooth Pressure Case Gamma Ray Borehole corrected is recorded data.
4. The following smoothing parameters have been applied to the data:
  - All ROP in logs - 0.5 ft interval, 1.2 ft coercion distance.
  - Gamma in 2" (1:600) logs - 1 ft interval, 3 ft coercion distance.
  - Gamma in 5" (1:240) logs - 0.5 ft interval, 0.6 ft coercion distance.
5. INSITE version 8.3.0.

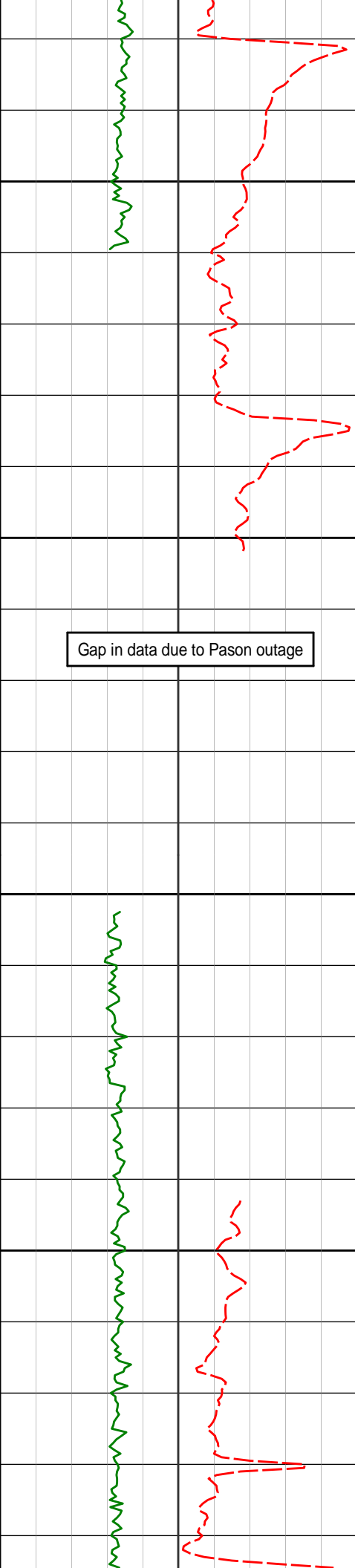
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# TVD Detail 1:240 Scale





5399'

8.97°

178.88°

5379182.17'

5400

5450

5493'

17.33°

181.37°

5474127.81'

5500

5550

5587'

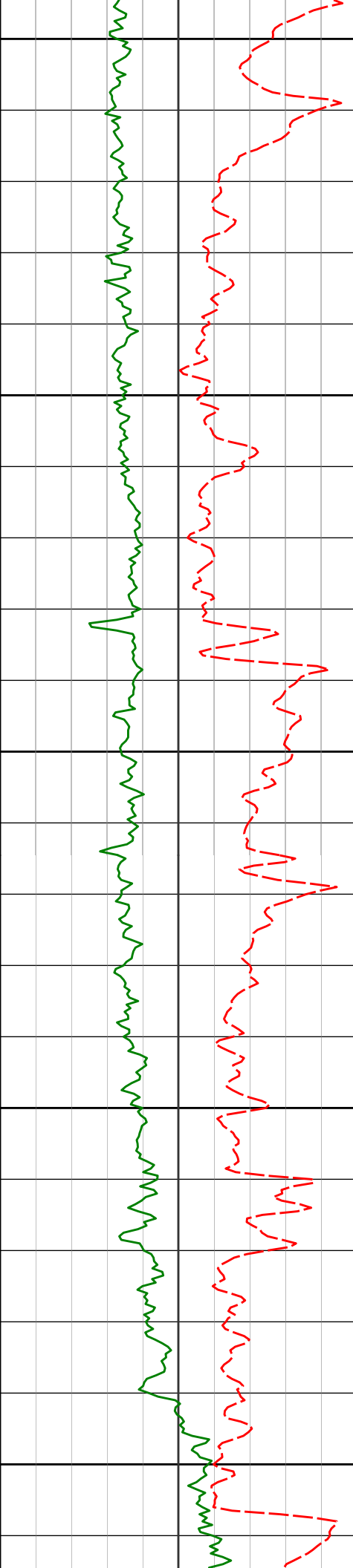
24.70°

180.48°

5558196.12'

141.69  
145.91

145.91



5600

145.91

5682'

32.40°

183.28°

5642.38' 56.78'

5650

150.13

5700

5776'

39.90°

182.27°

5718.20' 3.39'

5750

154.34

5870'

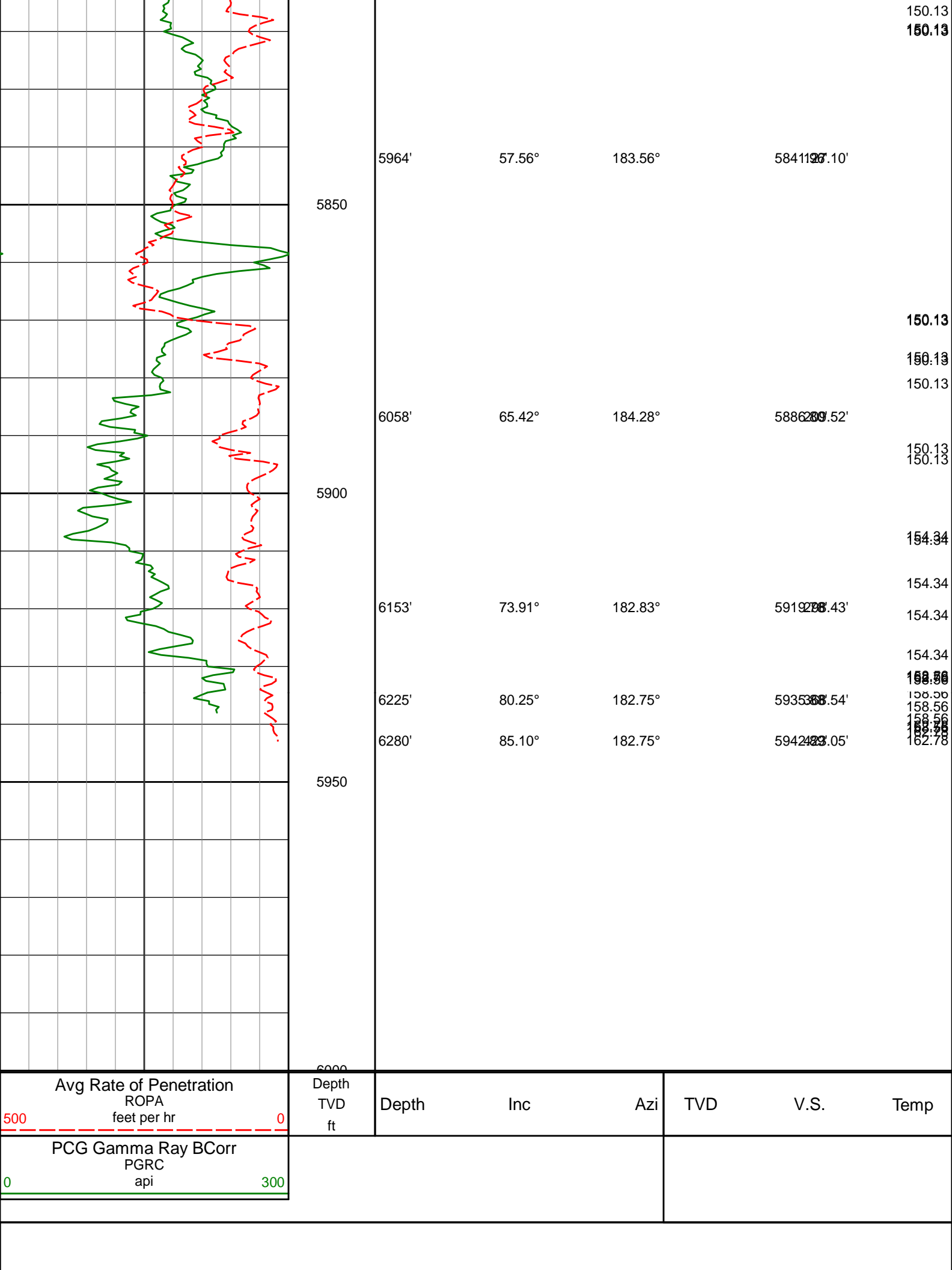
48.53°

181.52°

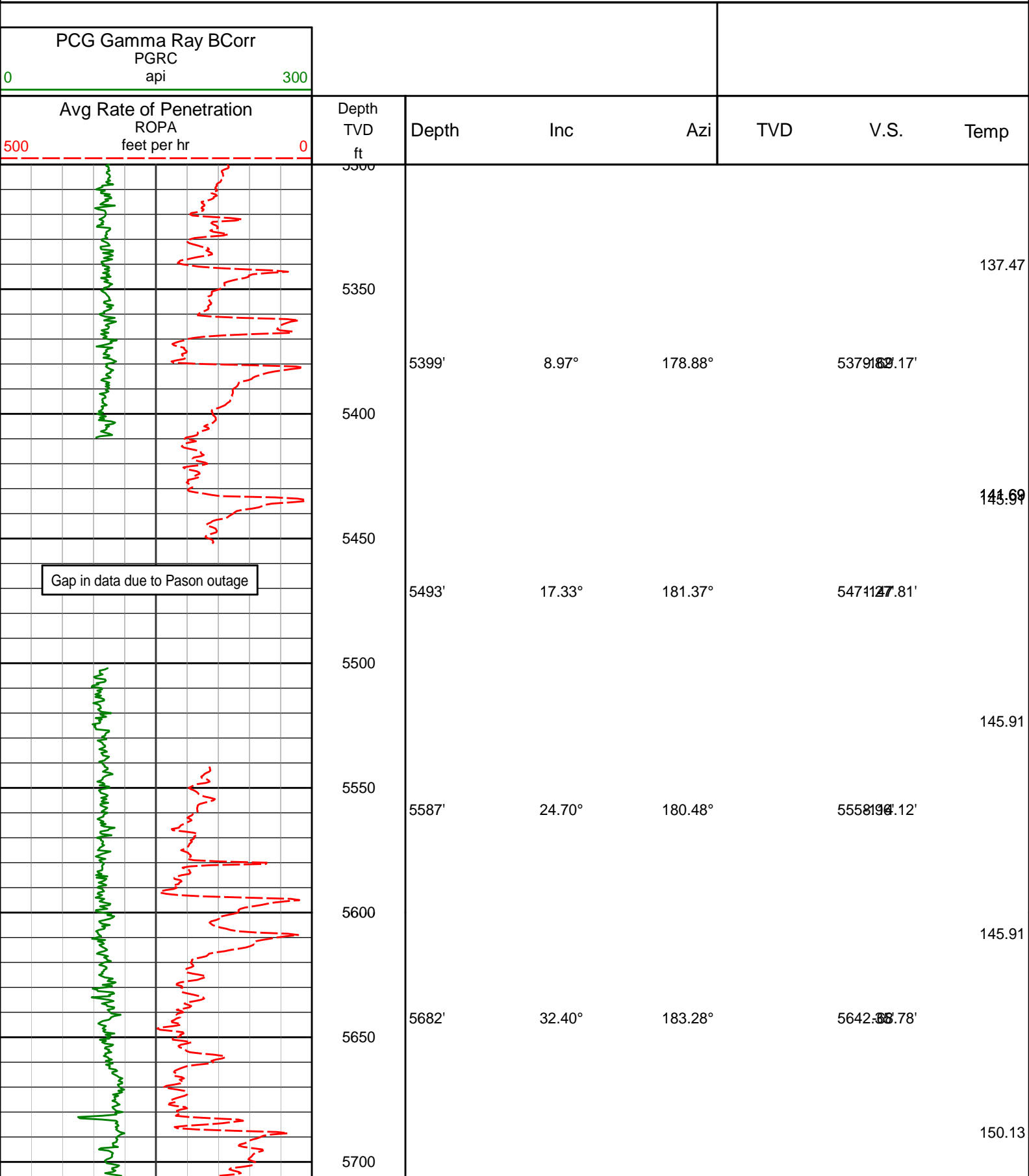
5785.52' 2.09'

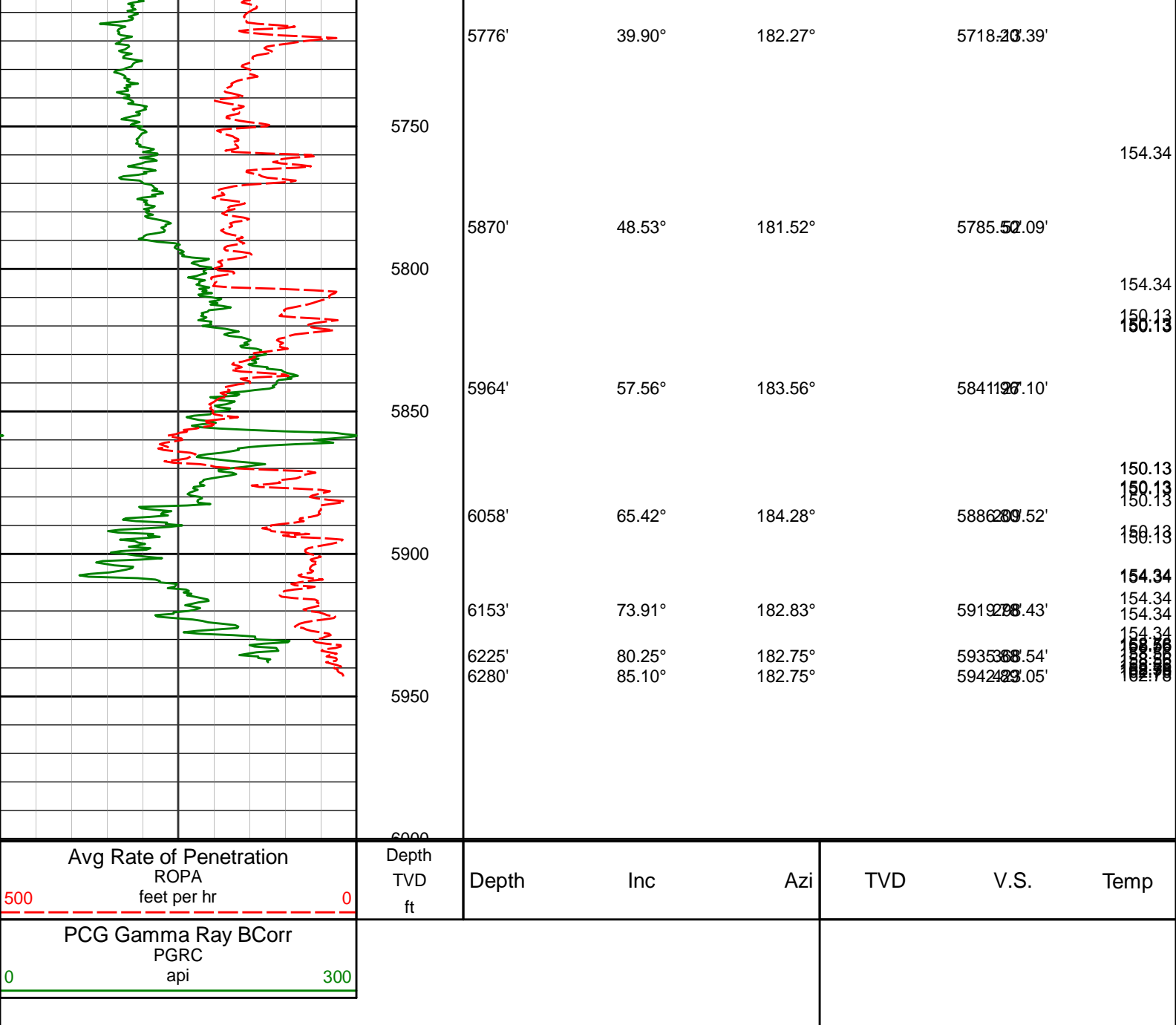
5800

154.34



# TVD Detail 1:600 Scale





## HALLIBURTON

### DIRECTIONAL SURVEY REPORT

Noble Energy  
Remora LC34-735  
Wattenberg  
Weld Colorado  
USA  
CA-XX-0902986601

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
250.00	0.07	107.42	250.00	0.05 S	0.15 E	0.04	0.03
500.00	0.13	107.42	500.00	0.18 S	0.56 E	0.17	0.02
618.00	0.17	107.42	618.00	0.27 S	0.86 E	0.25	0.03
631.00	0.17	107.42	631.00	0.28 S	0.89 E	0.26	0.03
726.00	0.21	143.88	726.00	0.46 S	1.13 E	0.44	0.13
820.00	0.31	165.78	820.00	0.85 S	1.30 E	0.83	0.15



1008.00	0.83	164.87	1007.99	2.67 S	1.78 E	2.63	0.28
1103.00	0.92	148.09	1102.98	3.98 S	2.36 E	3.93	0.28
1194.00	1.10	6.34	1193.97	3.73 S	2.84 E	3.68	2.09
1378.00	1.77	350.94	1377.91	0.82 N	2.59 E	-0.87	0.42
1470.00	1.89	336.56	1469.87	3.61 N	1.76 E	-3.65	0.52
1561.00	2.04	331.67	1560.81	6.42 N	0.40 E	-6.43	0.25
1652.00	1.96	332.30	1651.76	9.22 N	1.10 W	-9.20	0.10
1744.00	3.23	324.66	1743.66	12.73 N	3.33 W	-12.67	1.43
1836.00	5.40	322.25	1835.39	18.28 N	7.48 W	-18.14	2.36
1927.00	8.14	319.26	1925.75	26.54 N	14.31 W	-26.28	3.03
2018.00	9.67	311.86	2015.66	36.52 N	24.21 W	-36.08	2.10
2109.00	9.86	305.70	2105.34	46.17 N	36.23 W	-45.51	1.17
2201.00	9.91	304.03	2195.97	55.20 N	49.19 W	-54.30	0.32
2293.00	8.00	306.25	2286.85	63.42 N	60.91 W	-62.30	2.11
2385.00	7.62	314.01	2378.00	71.44 N	70.46 W	-70.15	1.22
2476.00	8.83	318.38	2468.06	80.85 N	79.44 W	-79.40	1.50
2568.00	10.33	321.08	2558.78	92.54 N	89.31 W	-90.91	1.70
2660.00	10.89	321.20	2649.20	105.73 N	99.94 W	-103.90	0.62
2751.00	10.82	320.67	2738.57	119.04 N	110.74 W	-117.01	0.13
2846.00	10.91	319.38	2831.87	132.76 N	122.24 W	-130.52	0.27
2940.00	8.84	316.09	2924.48	144.72 N	133.04 W	-142.28	2.27
3035.00	7.63	312.78	3018.50	154.26 N	142.74 W	-151.64	1.37
3130.00	7.04	309.32	3112.72	162.23 N	151.87 W	-159.45	0.77
3224.00	4.40	304.14	3206.24	167.91 N	159.31 W	-164.99	2.86
3319.00	4.09	303.07	3300.98	171.80 N	165.17 W	-168.77	0.33
3414.00	2.47	292.15	3395.82	174.42 N	169.91 W	-171.31	1.82
3508.00	2.03	239.04	3489.76	174.33 N	173.21 W	-171.16	2.18
3697.00	1.45	208.03	3678.68	170.49 N	177.21 W	-167.25	0.57
3792.00	1.36	215.66	3773.65	168.51 N	178.44 W	-165.25	0.22
3887.00	1.09	214.30	3868.63	166.85 N	179.60 W	-163.56	0.28
3982.00	1.00	235.44	3963.61	165.63 N	180.80 W	-162.32	0.42
4076.00	0.79	231.69	4057.60	164.76 N	181.98 W	-161.43	0.24
4171.00	0.93	232.08	4152.59	163.88 N	183.11 W	-160.53	0.15
4265.00	0.62	237.42	4246.58	163.14 N	184.13 W	-159.77	0.34
4360.00	0.59	285.18	4341.57	162.99 N	185.03 W	-159.61	0.51
4455.00	0.74	295.30	4436.57	163.38 N	186.06 W	-159.98	0.20
4549.00	1.08	332.08	4530.56	164.42 N	187.02 W	-161.00	0.70
4739.00	2.14	44.86	4720.49	168.52 N	185.35 W	-165.13	1.10
4833.00	1.78	54.35	4814.44	170.62 N	182.92 W	-167.27	0.51
4927.00	1.85	62.50	4908.39	172.17 N	180.38 W	-168.87	0.28
5022.00	1.69	33.23	5003.35	174.05 N	178.25 W	-170.79	0.96
5116.00	1.92	39.51	5097.30	176.43 N	176.49 W	-173.19	0.32
5210.00	1.72	34.61	5191.25	178.80 N	174.69 W	-175.60	0.27
5305.00	1.60	97.19	5286.22	179.81 N	172.56 W	-176.65	1.82
5399.00	8.97	178.88	5379.82	172.31 N	171.12 W	-169.17	9.44
5493.00	17.33	181.37	5471.27	150.95 N	171.31 W	-147.81	8.92
5587.00	24.70	180.48	5558.96	117.26 N	171.81 W	-114.12	7.84
5682.00	32.40	183.28	5642.35	71.94 N	173.43 W	-68.78	8.22
5776.00	39.90	182.27	5718.20	16.59 N	176.07 W	-13.39	8.01
5870.00	48.53	181.52	5785.50	48.87 S	178.20 W	52.09	9.20
5964.00	57.56	183.56	5841.96	123.82 S	181.60 W	127.10	9.76
6058.00	65.42	184.28	5886.80	206.16 S	187.26 W	209.52	8.39
6153.00	73.91	182.83	5919.78	294.98 S	192.75 W	298.43	9.06
6225.00	80.25	182.75	5935.88	365.04 S	196.17 W	368.54	8.80
6280.00	85.10	182.75	5942.89	419.51 S	198.79 W	423.05	8.82

**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 181.04 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.03 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6280.00 FEET  
IS 464.23 FEET ALONG 205.35 DEGREES (GRID)**

**Final survey is a projection to TD**