



1 : 600 / 1 : 240

WELL INFORMATION					
MWD Run Number	100				
Date run completed	08-Aug-15				
Rig Bit Number	0200				
Bit Size (in)	8.750				
Tool Nominal OD (in)	6.750				
Log Start Depth (TVD, ft)	1,124.99				
Log End Depth (TVD, ft)	5,855.45				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	07-Aug-15 04:00				
Drill/Wipe End Date and Time	08-Aug-15 02:30				
Min Inc (deg) @ Depth (TVD, ft)	0.48 @ 1,289.99				
Max Inc (deg) @ Depth (TVD, ft)	81.68 @ 5,848.72				
Bit TFA(in2) / Bit Type	0.98 / PDC				
Flow Rate (gpm)	593.72				
Max AV (fpm) / CV (fpm) @ MWD	550.0 / 550.0				
Fluid Type	Native/Spud Mud				
Density (ppg) / Viscosity (spqt)	9.20 / 41.00				
Filtrate CL (ppm)	15,000.00				
pH / Fluid Loss (mptm)	9.50 / 11				
PV (cP) / YP (lhf2)	12 / 11.00				
% Solids / % Sand	2.20 / 0.20				
% 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) @ Depth	478.72 @ 5,848.72				

Max Tool Temp (degF) / Source	172.78 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ N/A				
Lead MWD Engineer	Adam Sampson				
Customer Representative	Dave Neilsen				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.93				
Sub Serial Number	11404289				
Insert Serial Number	11680799				
Date and Time Initialized	06-Aug-15 20:12				
Date and Time Read	08-Aug-15 07:04				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	56.00				
Software Version	6.21				
Sub Serial Number	11404289				
Sonde Serial Number	11145703				
Sensor ID Number	N/A				
Toolface Offset (deg)	311.20				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	44.11				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11404289				
Insert/Sonde Serial Number	11680952				

REMARKS

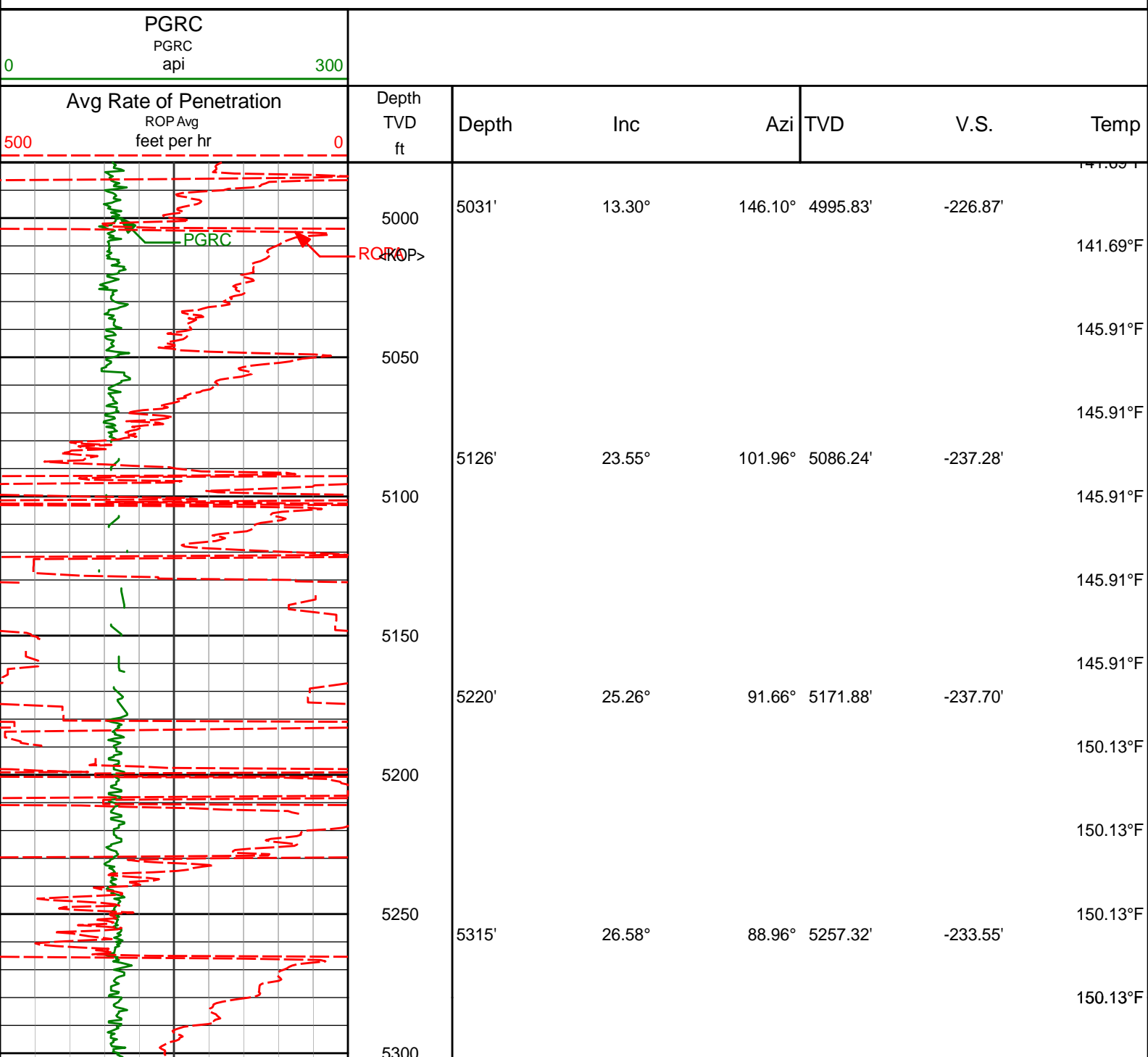
1. All depths are calibrated to the driller's pipe tally and are measured from the Rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
 - ROPA: Average Rate of Penetration is real time data.
 - 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

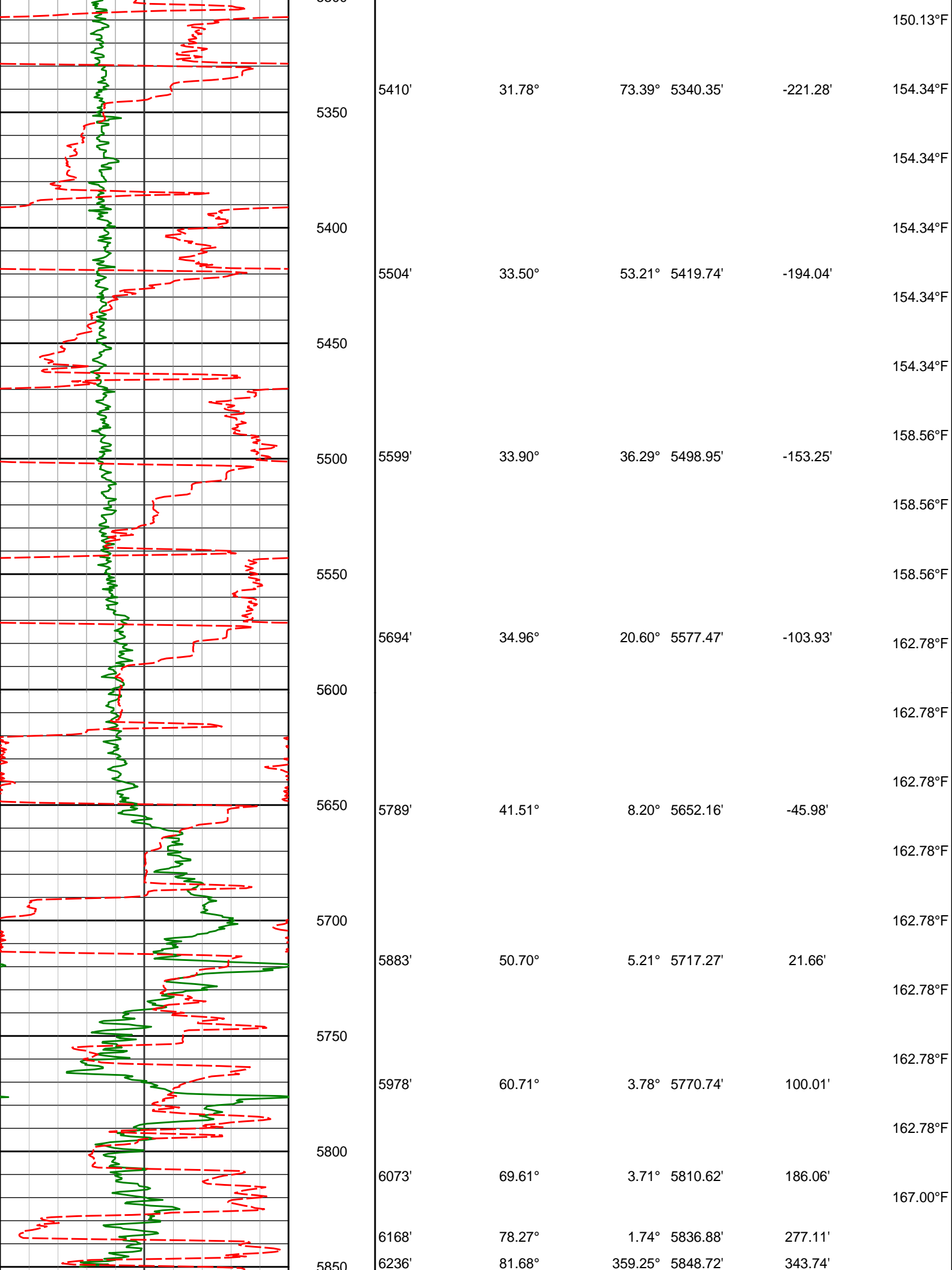
WARRANTY

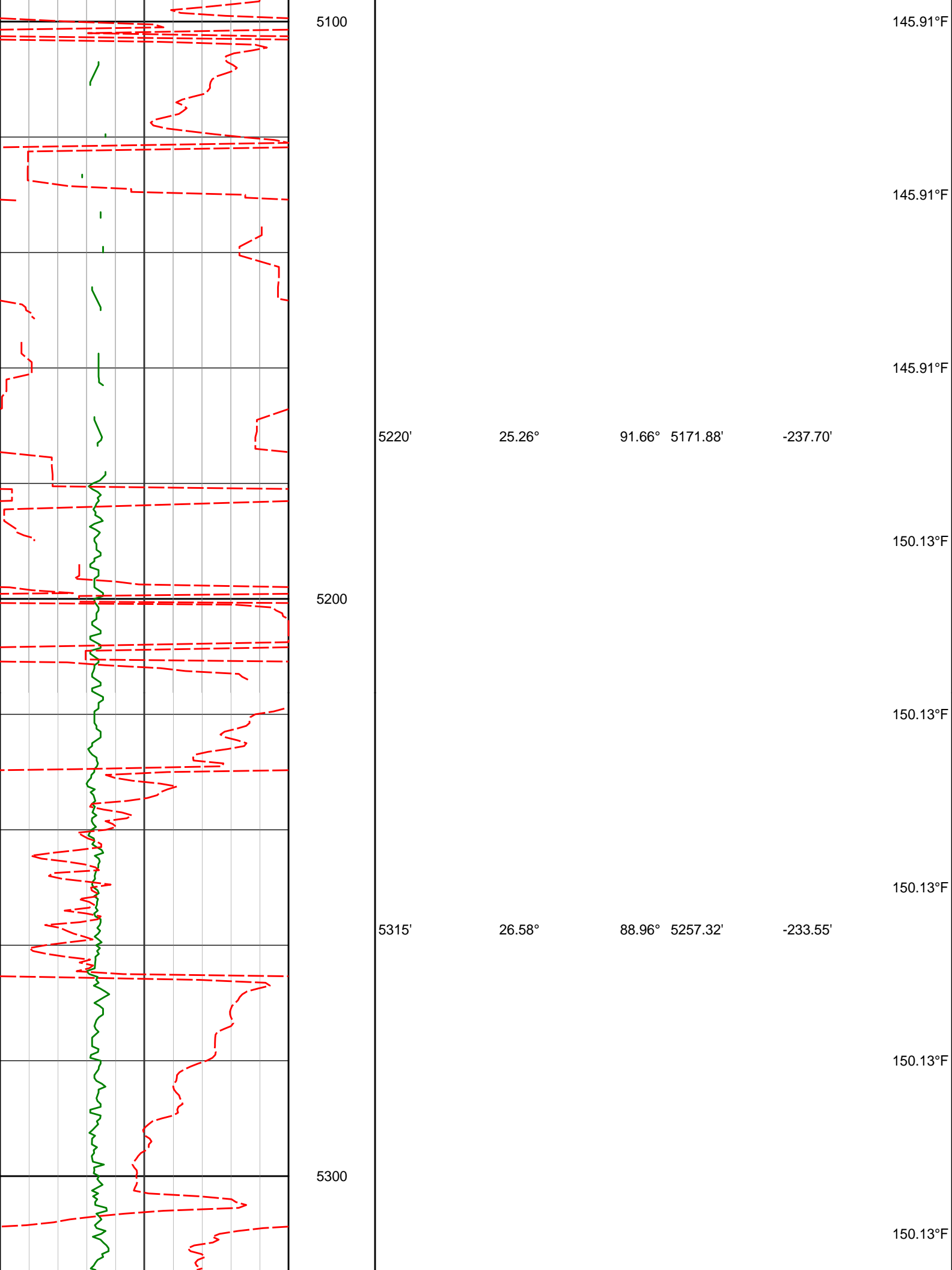
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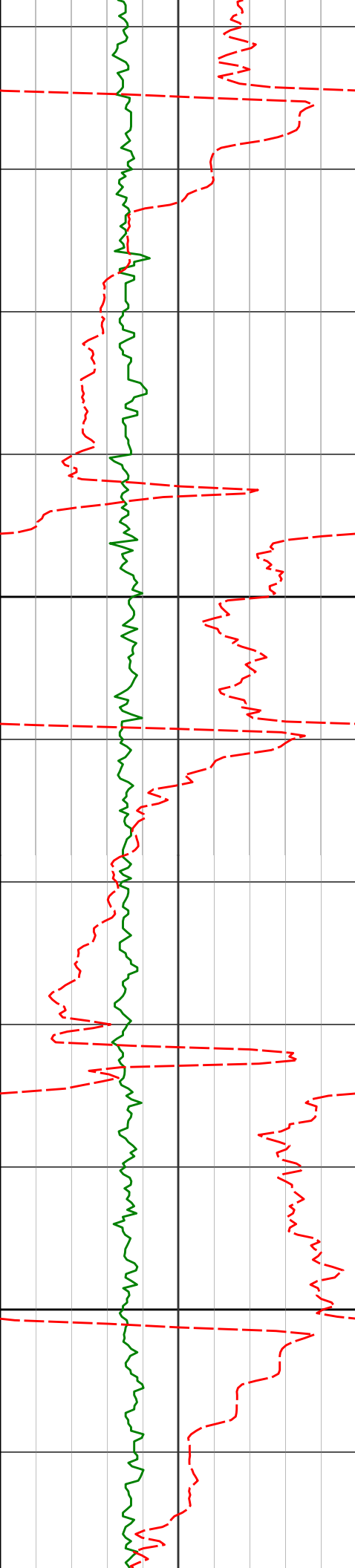
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TVD Detail 1:600 Scale









5400

5500

5410'

31.78°

73.39°

5340.35'

-221.28'

154.34°F

154.34°F

154.34°F

5504'

33.50°

53.21°

5419.74'

-194.04'

154.34°F

154.34°F

158.56°F

5599'

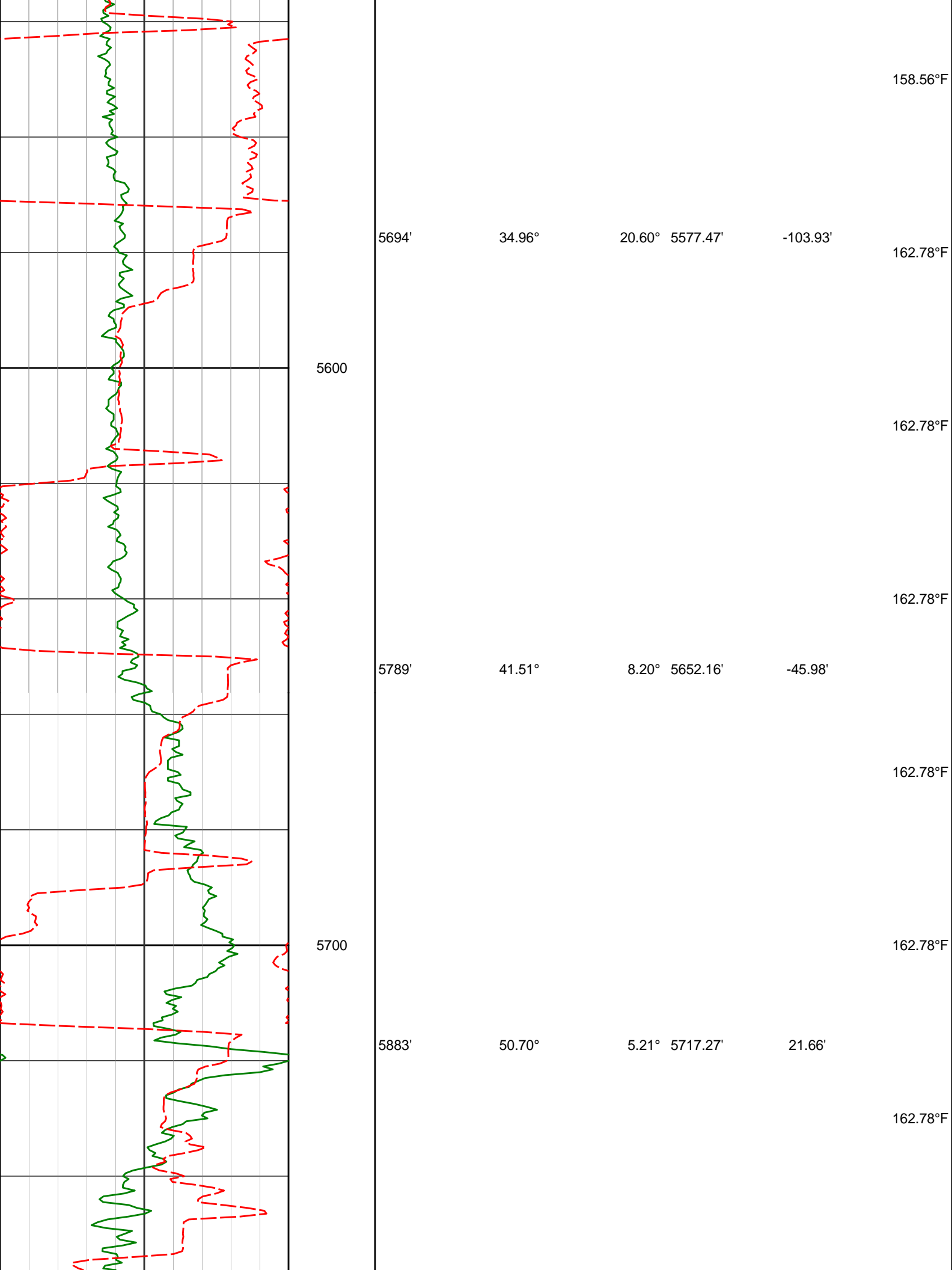
33.90°

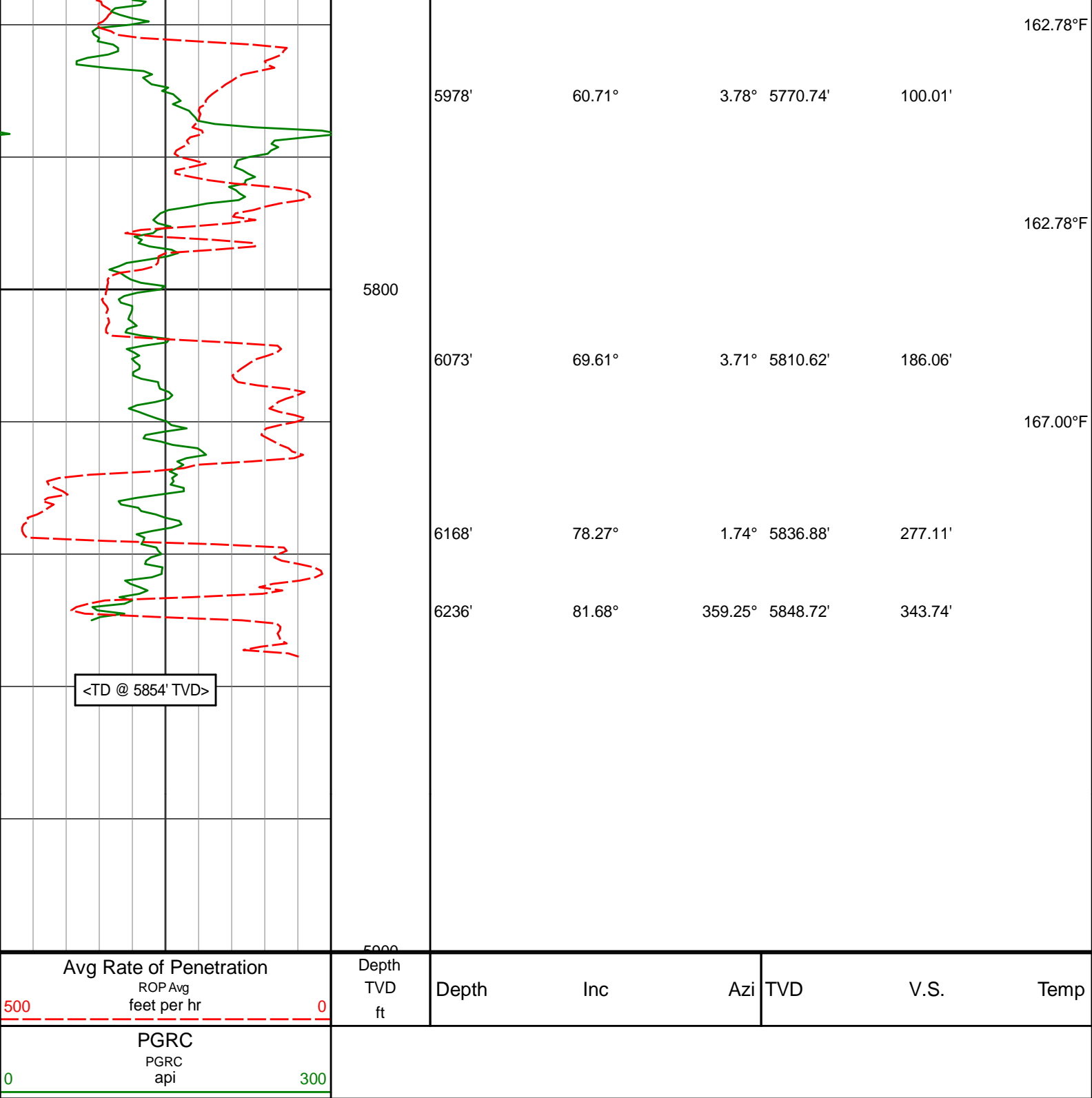
36.29°

5498.95'

-153.25'

158.56°F





DIRECTIONAL SURVEY REPORT
Noble Energy
Brecken LD28-727
Wattenberg
Weld Colorado
USA
CA-XX-0902606363

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
86.75	0.30	26.05	86.75	0.20 N	0.10 E	0.21	0.34
178.00	0.22	292.18	178.00	0.48 N	0.04 E	0.48	0.42

269.25	0.30	344.52	269.25	0.78 N	0.18 W	0.75	0.26
360.50	0.18	283.58	360.50	1.04 N	0.39 W	1.00	0.29
451.75	0.18	238.77	451.75	1.00 N	0.65 W	0.93	0.15
543.00	0.09	223.80	543.00	0.87 N	0.82 W	0.78	0.10
634.25	0.12	77.58	634.25	0.84 N	0.78 W	0.75	0.22
725.50	0.14	175.56	725.50	0.75 N	0.68 W	0.67	0.22
816.75	0.16	166.49	816.75	0.51 N	0.64 W	0.44	0.03
908.00	0.22	157.03	908.00	0.23 N	0.55 W	0.17	0.08
999.25	0.24	151.51	999.24	0.11 S	0.38 W	-0.15	0.03
1090.50	0.14	213.86	1090.49	0.37 S	0.35 W	-0.40	0.24
1290.00	0.48	348.95	1289.99	0.26 N	0.65 W	0.19	0.29
1381.00	0.75	1.53	1380.99	1.22 N	0.70 W	1.14	0.32
1472.00	0.81	6.36	1471.98	2.45 N	0.62 W	2.38	0.10
1564.00	0.65	24.74	1563.97	3.58 N	0.32 W	3.52	0.30
1655.00	0.71	17.54	1654.97	4.58 N	0.06 E	4.56	0.11
1747.00	0.87	2.27	1746.96	5.82 N	0.26 E	5.82	0.28
1838.00	1.04	1.18	1837.94	7.33 N	0.31 E	7.32	0.19
1930.00	1.05	357.86	1929.93	9.00 N	0.29 E	8.98	0.07
2021.00	1.27	1.10	2020.91	10.84 N	0.28 E	10.81	0.26
2113.00	1.16	10.10	2112.89	12.77 N	0.46 E	12.75	0.24
2205.00	1.10	9.92	2204.87	14.56 N	0.78 E	14.56	0.06
2297.00	1.14	1.14	2296.85	16.35 N	0.95 E	16.36	0.19
2389.00	1.30	358.24	2388.83	18.30 N	0.93 E	18.30	0.19
2480.00	1.30	349.12	2479.81	20.35 N	0.71 E	20.31	0.23
2572.00	1.42	344.43	2571.78	22.47 N	0.20 E	22.37	0.18
2663.00	1.31	340.43	2662.76	24.54 N	0.45 W	24.36	0.16
2758.00	1.38	340.52	2757.73	26.64 N	1.19 W	26.37	0.07
2853.00	1.32	333.86	2852.71	28.70 N	2.05 W	28.32	0.18
2948.00	1.12	328.40	2947.68	30.46 N	3.02 W	29.98	0.24
3042.00	1.55	137.65	3041.68	30.31 N	2.64 W	29.86	2.82
3137.00	4.69	140.54	3136.52	26.36 N	0.69 E	26.29	3.31
3232.00	6.41	147.07	3231.07	18.91 N	6.04 E	19.44	1.93
3326.00	8.43	148.43	3324.28	8.63 N	12.50 E	9.90	2.15
3421.00	8.42	148.55	3418.26	3.23 S	19.77 E	-1.14	0.02
3516.00	11.57	139.98	3511.81	16.46 S	29.53 E	-13.27	3.66
3611.00	11.70	140.82	3604.86	31.22 S	41.74 E	-26.67	0.22
3705.00	11.39	142.46	3696.96	45.97 S	53.41 E	-40.11	0.48
3800.00	10.04	143.22	3790.30	60.04 S	64.09 E	-52.98	1.43
3895.00	10.95	140.60	3883.71	73.64 S	74.77 E	-65.39	1.08
3989.00	13.12	137.12	3975.64	88.36 S	87.70 E	-78.67	2.43
4084.00	12.58	137.14	4068.26	103.84 S	102.07 E	-92.56	0.57
4179.00	11.78	135.57	4161.12	118.34 S	115.90 E	-105.54	0.91
4273.00	11.07	134.48	4253.26	131.52 S	129.05 E	-117.26	0.78
4368.00	11.10	138.04	4346.49	144.71 S	141.68 E	-129.06	0.72
4463.00	10.14	139.09	4439.86	157.83 S	153.26 E	-140.89	1.03
4557.00	10.92	143.49	4532.28	171.24 S	163.98 E	-153.10	1.19
4652.00	12.70	145.05	4625.26	187.03 S	175.31 E	-167.62	1.91
4747.00	11.66	143.04	4718.13	203.26 S	187.07 E	-182.52	1.18
4842.00	12.38	143.23	4811.04	219.09 S	198.94 E	-197.02	0.77
4936.00	11.36	145.07	4903.03	234.76 S	210.27 E	-211.41	1.16
5031.00	13.30	146.10	4995.83	251.51 S	221.73 E	-226.87	2.05
5126.00	23.55	101.96	5086.24	264.60 S	246.56 E	-237.28	17.53
5220.00	25.26	91.66	5171.88	269.07 S	285.00 E	-237.70	4.87
5315.00	26.58	88.96	5257.32	269.27 S	326.52 E	-233.55	1.87
5410.00	31.78	73.39	5340.35	261.72 S	371.84 E	-221.28	9.65
5504.00	33.50	53.21	5419.74	239.03 S	416.47 E	-194.04	11.68
5599.00	33.90	36.29	5498.95	201.90 S	453.23 E	-153.25	9.86
5694.00	34.96	20.60	5577.47	154.97 S	478.54 E	-103.93	9.38
5789.00	41.51	8.20	5652.16	98.19 S	492.64 E	-45.98	10.60
5883.00	50.70	5.21	5717.27	30.99 S	500.40 E	21.66	10.04
5978.00	60.71	3.78	5770.74	47.15 N	506.48 E	100.01	10.61
6073.00	69.61	3.71	5810.62	133.09 N	512.11 E	186.06	9.37
6168.00	78.27	1.74	5836.88	224.19 N	516.40 E	277.11	9.33
6236.00	81.68	359.25	5848.72	291.13 N	516.97 E	343.74	6.18

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 6.02 DEGREES (GRID)
A TOTAL CORRECTION OF 6.96 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6236.00 FEET
IS 593.31 FEET ALONG 60.61 DEGREES (GRID)

First MWD survey is at 1290'. The prior surveys were done with gyro

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