



1 : 600 / 1 : 240

WELL INFORMATION					
MWD Run Number	100				
Date run completed	24-Sep-15				
Rig Bit Number	0100				
Bit Size (in)	8.750				
Tool Nominal OD (in)	6.750				
Log Start Depth (TVD, ft)	623.00				
Log End Depth (TVD, ft)	6,516.28				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	23-Sep-15 03:30				
Drill/Wipe End Date and Time	24-Sep-15 02:20				
Min Inc (deg) @ Depth (TVD, ft)	0.15 @ 1,952.96				
Max Inc (deg) @ Depth (TVD, ft)	88.00 @ 6,516.28				
Bit TFA(in2) / Bit Type	1.04 / PDC				
Flow Rate (gpm)	591.94				
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A				
Fluid Type	Native/Spud Mud				
Density (ppg) / Viscosity (spqt)	10.60 / 28.00				
Filtrate CL (ppm)	1,900.00				
pH / Fluid Loss (mptm)	9.60 / 62				
PV (cP) / YP (lhf2)	2 / 3.00				
% Solids / % Sand	3.40 / 0.15				
% 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				
MWD Tool Temp (degF)	172.75 / 204.1				

Max Tool Temp (degF) / Source	172.78 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ N/A				
Lead MWD Engineer	Henry Schmeidler				
Customer Representative	Cliff Kester				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.93				
Sub Serial Number	11404299				
Insert Serial Number	11055866				
Date and Time Initialized	22-Sep-15 20:12				
Date and Time Read	24-Sep-15 07:22				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	65.00				
Software Version	6.33				
Sub Serial Number	11404299				
Sonde Serial Number	11062113				
Sensor ID Number	N/A				
Toolface Offset (deg)	331.90				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	58.06				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11404299				
Insert/Sonde Serial Number	11293345				

REMARKS

1. All depths are calibrated to driller's pipe tally and are total vertical depth from the 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.
4. Environmental parameters used in gamma and resistance processing:
Hole Size: 8.75"
Mud Density: 9.9-11.0
5. The following smoothing parameters have been applied to the data:

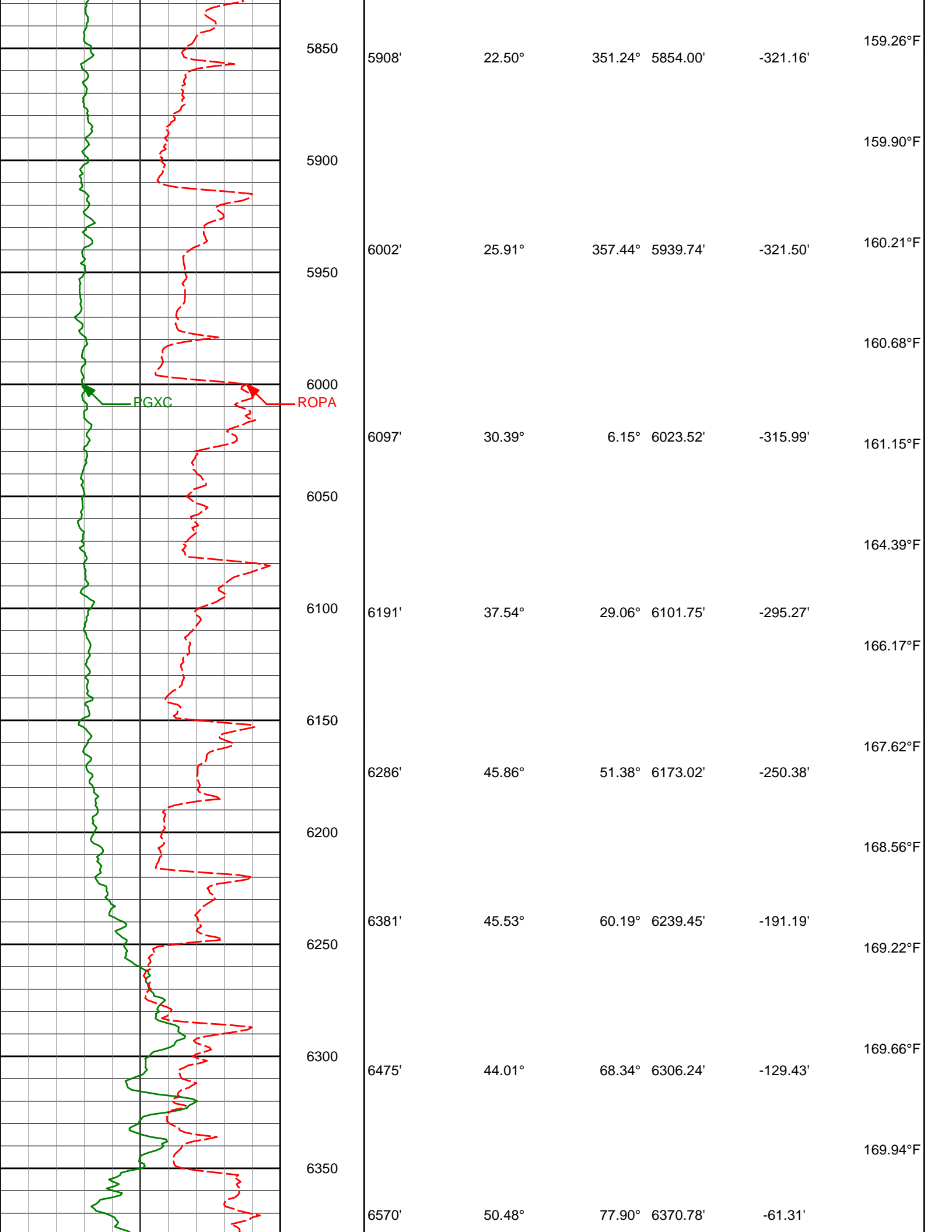
1:600 (2"):
Interval: 1.0 ft
Coercion Distance: 3.0 ft (ROPA)
Interval: 1.0 ft
Coercion Distance: 3.0 ft (Gamma Ray)

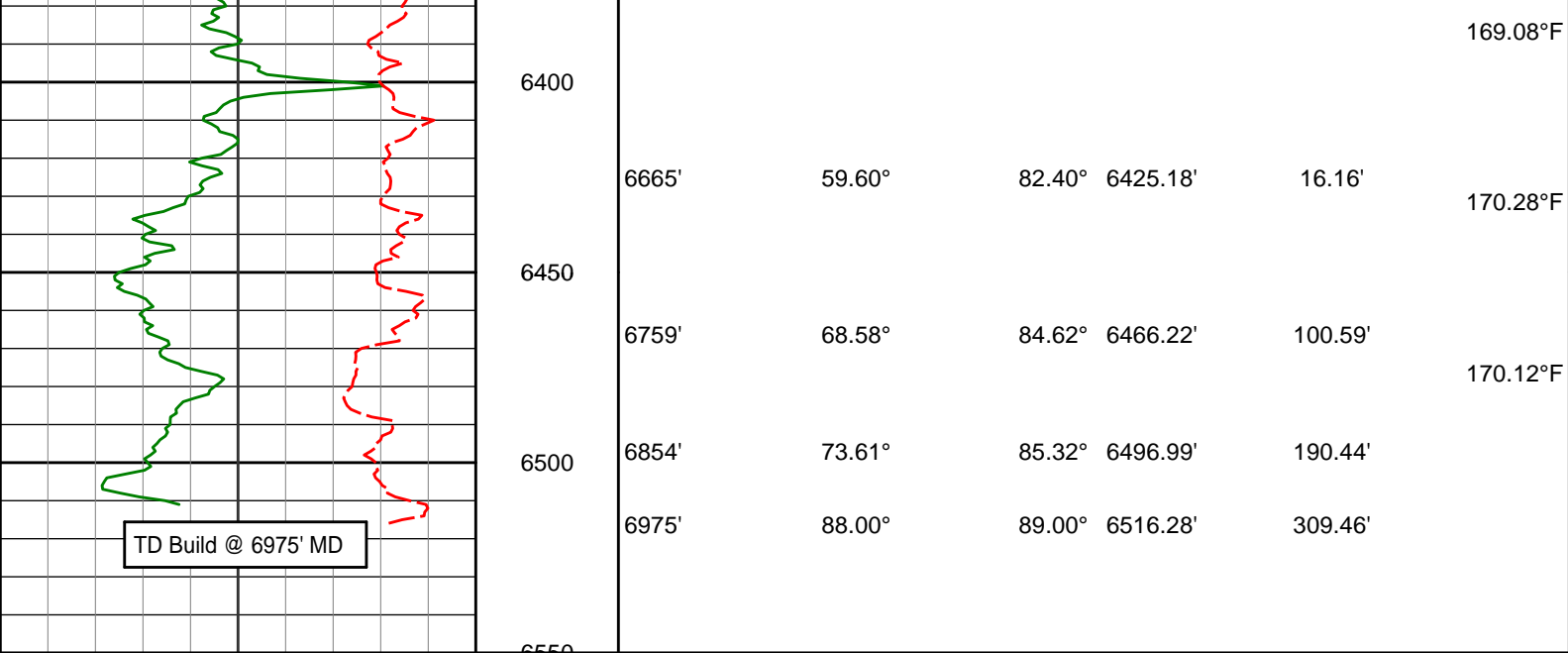
1:240 (5")
Interval: 0.5 ft
Coercion Distance: 1.2 ft (ROPA)
Interval: 0.5 ft
Coercion Distance: 0.6 ft (Gamma Ray)

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TVD Detail 1:600 Scale

PCG GR XHi-Range RT BCor PGXRC-T api								
0300		Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	Temp
Avg Rate of Penetration ROPA feet per hr								
1K0								
		5550						149.45°F
		5600	5624'	12.12°	310.94°	5587.07'	-300.24'	151.22°F
		<KOP>						151.69°F
		5650	5719'	20.44°	340.67°	5678.33'	-311.33'	154.96°F
		5700						157.23°F
		5750	5813'	21.83°	347.59°	5766.02'	-317.67'	156.36°F
		5800						

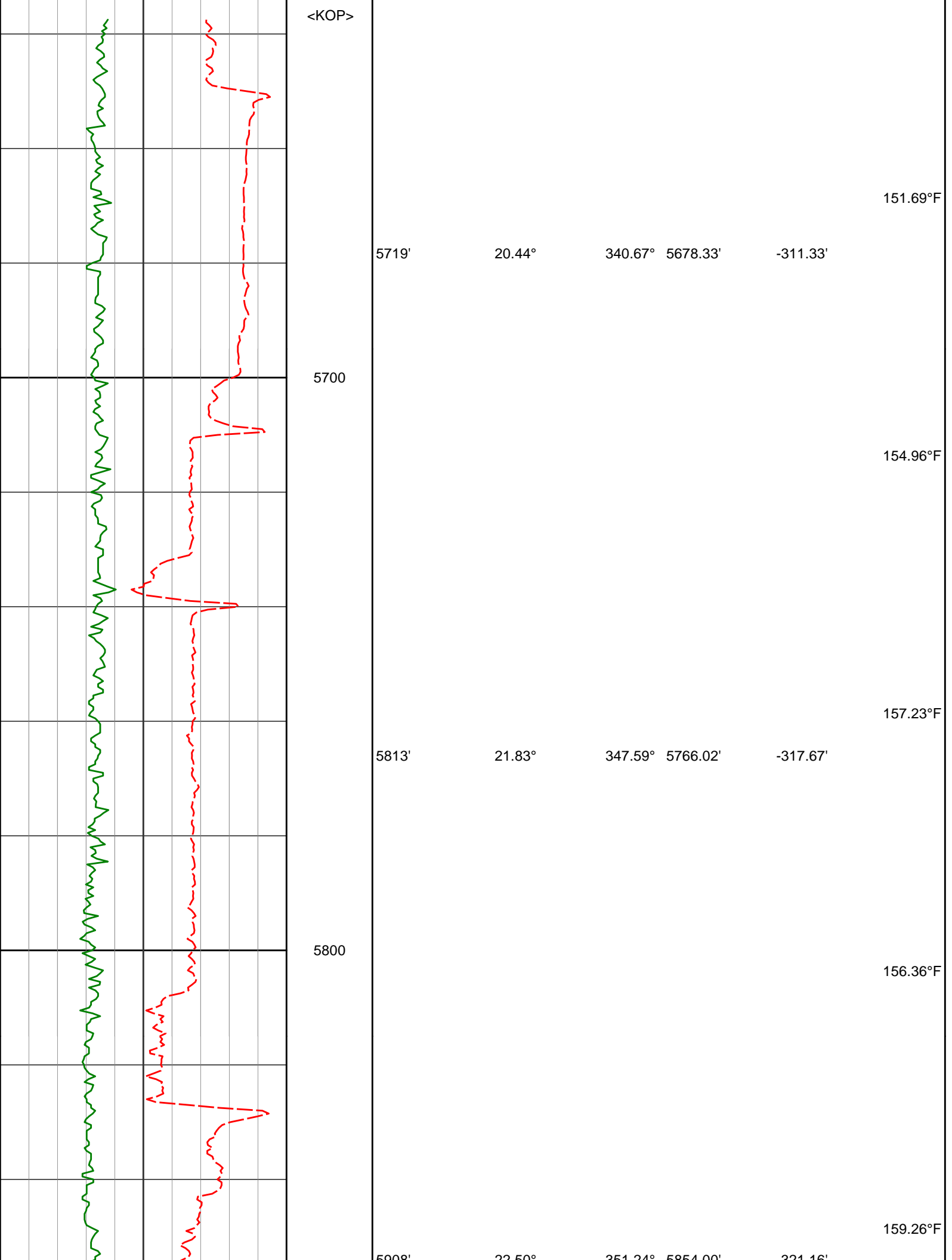


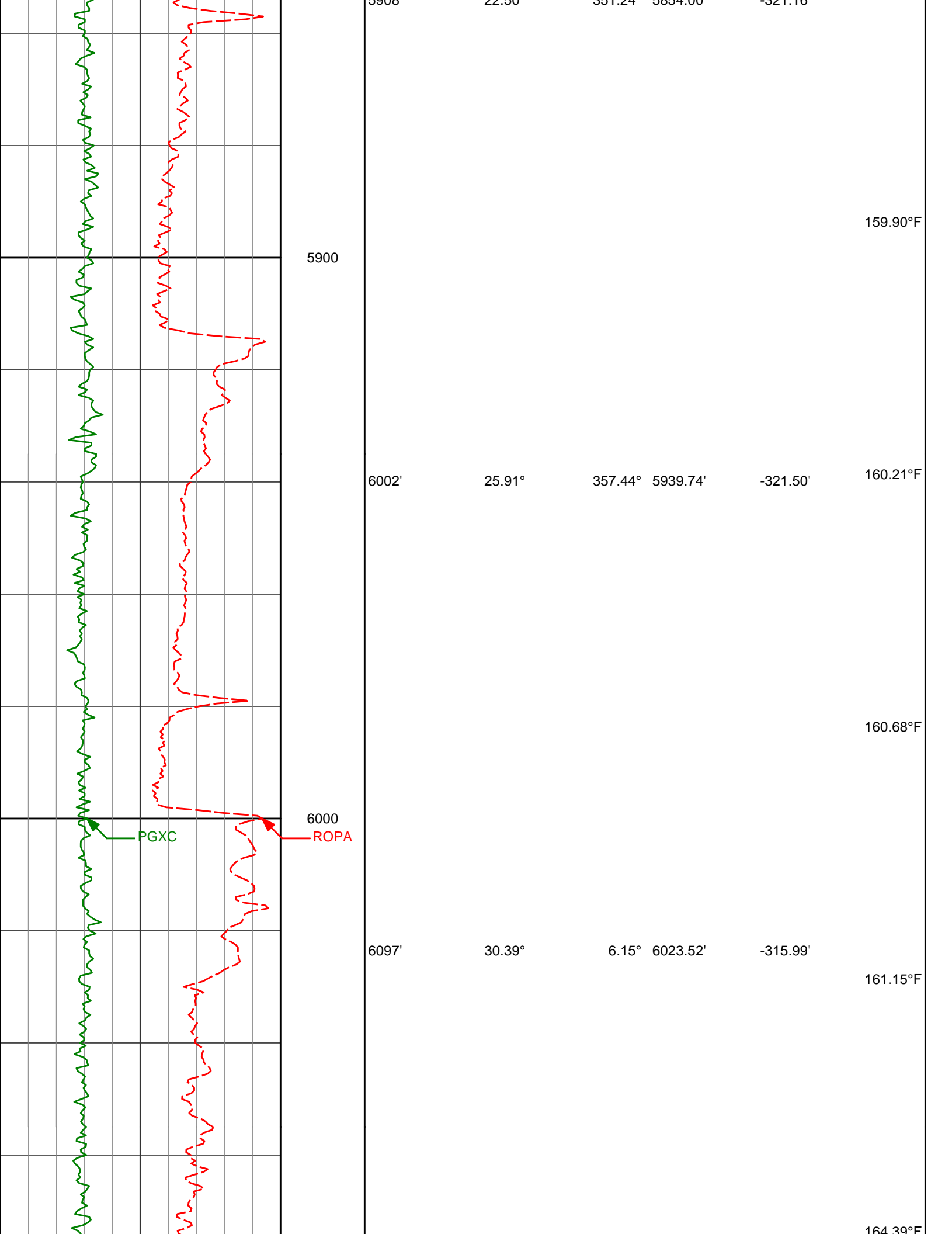


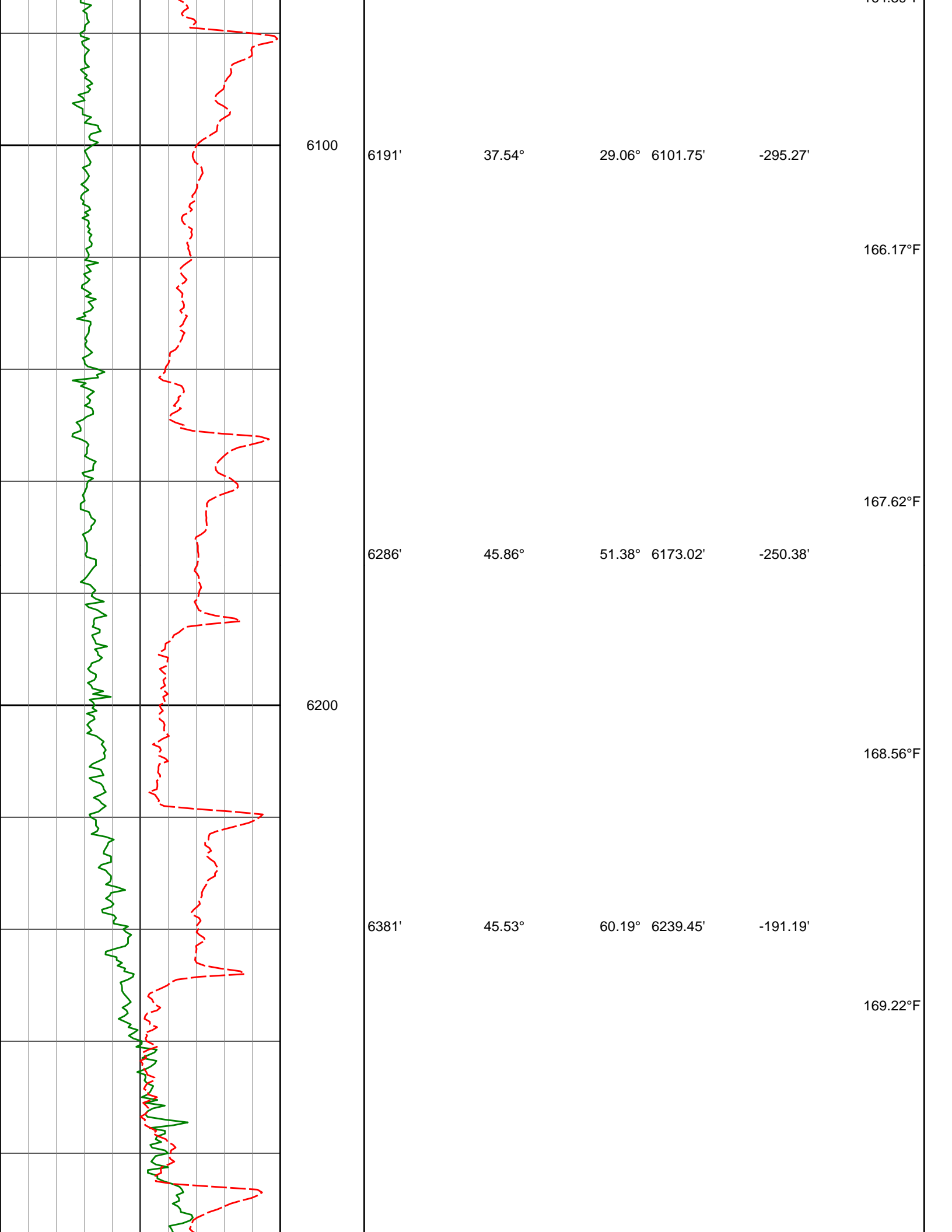
Avg Rate of Penetration ROPA feet per hr		Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	Temp
PCG GR XHi-Range RT BCor PGXRC-T api								

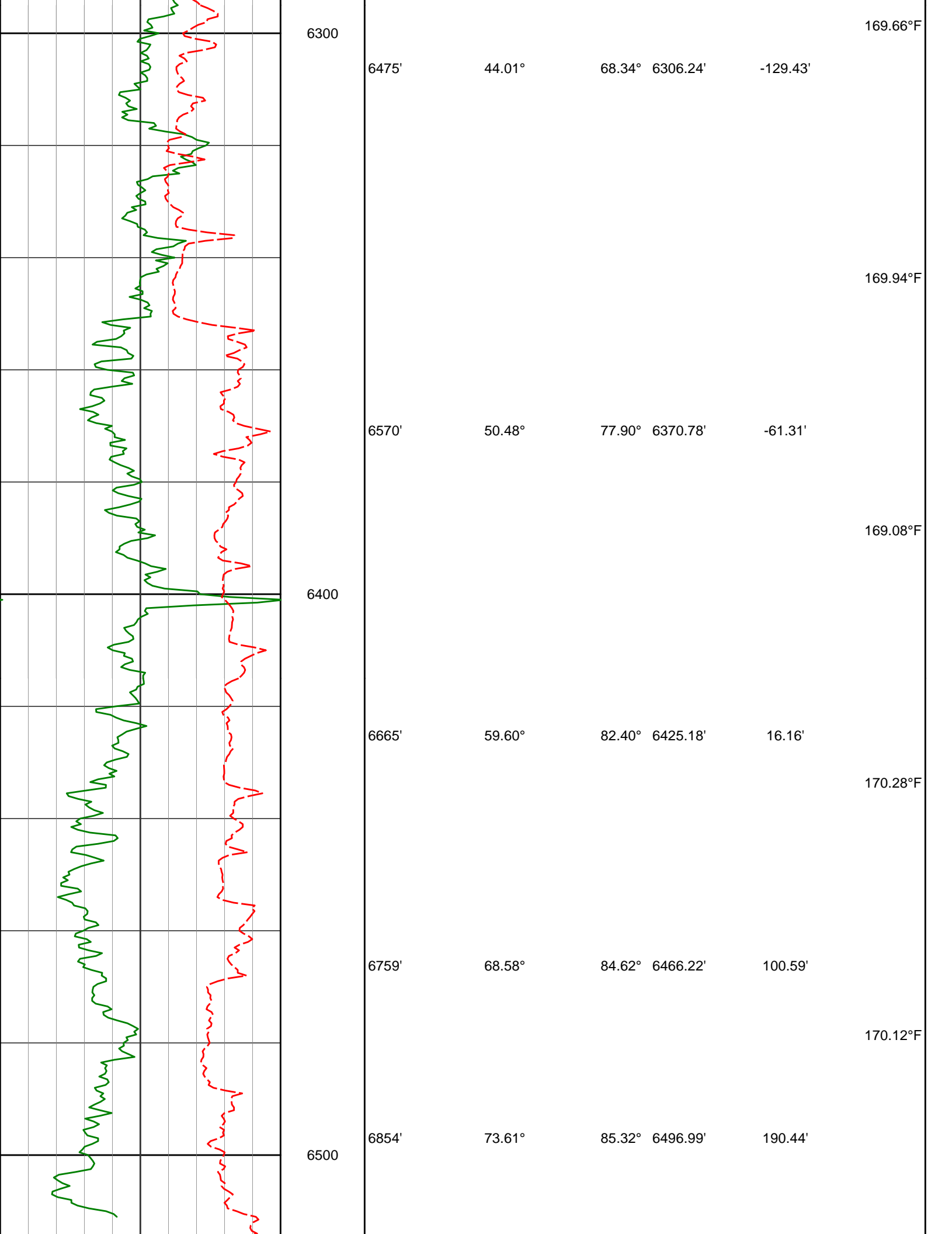
TVD Detail 1:240 Scale

PCG GR XHi-Range RT PGXRC-T api																									
0300																									
Avg Rate of Penetration ROPA feet per hr										Depth TVD ft		Depth		Inc		Azi		TVD		V.S.		Temp			
1K0										5600		149.45°F													
												5624'12.12°310.94°5587.07'-300.24'													
												151.22°F													









<div>TD Build @ 6975' MD</div>										6975'										88.00°										89.00°										6516.28'										309.46'																																																	
Avg Rate of Penetration ROPA feet per hr										Depth TVD ft										Depth										Inc										Azi										TVD										V.S.										Temp																													
PCG GR XHi-Range RT PGXRC-T api																																																																																																			

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AE32-650
Wattenburg
Weld Colorado
USA
CA-XX-0902674377

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
646.00	0.38	190.56	646.00	2.11 S	0.39 W	-0.57	0.06
836.00	0.44	207.16	835.99	3.38 S	0.84 W	-1.13	0.07
931.00	0.44	202.60	930.99	4.04 S	1.15 W	-1.49	0.04
1025.00	0.59	230.07	1024.98	4.68 S	1.66 W	-2.05	0.30
1118.00	0.48	215.38	1117.98	5.31 S	2.25 W	-2.70	0.18
1212.00	0.25	240.41	1211.98	5.73 S	2.65 W	-3.14	0.29
1304.00	0.26	231.35	1303.98	5.96 S	2.99 W	-3.49	0.05
1491.00	0.51	261.49	1490.97	6.35 S	4.15 W	-4.68	0.17
1584.00	0.39	281.61	1583.97	6.35 S	4.86 W	-5.39	0.21
1676.00	0.47	304.25	1675.97	6.07 S	5.48 W	-5.98	0.20
1768.00	0.30	5.46	1767.97	5.62 S	5.76 W	-6.23	0.46
1861.00	0.25	47.30	1860.96	5.24 S	5.59 W	-6.02	0.22
1953.00	0.15	29.67	1952.96	4.99 S	5.39 W	-5.80	0.12
2048.00	0.32	248.25	2047.96	4.98 S	5.57 W	-5.98	0.47
2141.00	0.47	265.53	2140.96	5.11 S	6.18 W	-6.60	0.20
2234.00	0.65	253.13	2233.96	5.29 S	7.07 W	-7.50	0.24
2327.00	0.86	244.47	2326.95	5.74 S	8.20 W	-8.67	0.26
2420.00	0.70	235.20	2419.94	6.37 S	9.30 W	-9.82	0.22
2511.00	0.79	233.30	2510.93	7.06 S	10.26 W	-10.83	0.10
2603.00	0.77	231.02	2602.92	7.82 S	11.24 W	-11.88	0.04
2695.00	1.00	52.63	2694.92	7.72 S	11.08 W	-11.71	1.93
2788.00	0.65	69.74	2787.91	7.05 S	9.94 W	-10.51	0.46
2881.00	0.54	72.21	2880.91	6.73 S	9.02 W	-9.57	0.12
2975.00	0.62	94.29	2974.90	6.63 S	8.09 W	-8.64	0.25
3070.00	0.93	78.56	3069.89	6.52 S	6.83 W	-7.37	0.39
3164.00	1.75	354.73	3163.87	4.94 S	6.22 W	-6.62	2.01
3259.00	2.13	328.52	3258.82	1.99 S	7.27 W	-7.42	1.00
3353.00	1.92	329.00	3352.76	0.85 N	8.99 W	-8.89	0.23
3448.00	4.56	306.64	3447.60	4.46 N	12.84 W	-12.41	3.03
3543.00	6.47	305.35	3542.16	9.81 N	20.24 W	-19.31	2.02
3637.00	9.66	308.67	3635.22	17.81 N	30.72 W	-29.07	3.43
3732.00	12.44	307.75	3728.45	29.06 N	45.04 W	-42.36	2.93
3827.00	13.26	307.62	3821.07	41.97 N	61.76 W	-57.90	0.86
3921.00	12.62	314.45	3912.69	55.74 N	77.63 W	-72.52	1.76
4016.00	12.12	315.15	4005.48	70.08 N	92.07 W	-85.67	0.54
4110.00	12.02	315.62	4097.40	84.07 N	105.87 W	-98.24	0.16

4110.00	12.32	315.02	4097.40	84.07 N	103.87 W	-98.21	0.10
4205.00	11.27	315.50	4190.45	97.77 N	119.30 W	-110.40	0.78
4300.00	10.32	315.43	4283.76	110.45 N	131.78 W	-121.74	1.00
4394.00	9.75	315.46	4376.33	122.12 N	143.27 W	-132.17	0.61
4489.00	10.72	320.26	4469.82	134.64 N	154.55 W	-142.33	1.36
4583.00	9.13	315.55	4562.41	146.69 N	165.37 W	-152.06	1.89
4678.00	9.30	306.55	4656.19	156.64 N	176.81 W	-162.61	1.52
4772.00	9.72	298.21	4748.90	164.92 N	189.91 W	-174.94	1.53
4867.00	9.16	296.21	4842.61	172.05 N	203.76 W	-188.12	0.68
4962.00	11.05	300.60	4936.14	180.03 N	218.38 W	-202.00	2.14
5056.00	9.15	295.73	5028.68	187.86 N	232.87 W	-215.76	2.21
5151.00	9.53	297.50	5122.42	194.77 N	246.66 W	-228.89	0.50
5246.00	10.57	297.25	5215.96	202.40 N	261.39 W	-242.91	1.10
5340.00	11.55	302.38	5308.21	211.39 N	277.00 W	-257.69	1.48
5435.00	10.16	294.02	5401.51	219.90 N	292.70 W	-272.59	2.21
5530.00	10.78	305.49	5494.94	228.47 N	307.59 W	-286.68	2.28
5624.00	12.12	310.94	5587.07	240.03 N	322.20 W	-300.24	1.83
5719.00	20.44	340.67	5678.33	262.30 N	335.26 W	-311.33	12.14
5813.00	21.83	347.59	5766.02	294.86 N	344.45 W	-317.67	3.03
5908.00	22.50	351.24	5854.00	330.08 N	351.02 W	-321.16	1.62
6002.00	25.91	357.44	5939.74	368.39 N	354.68 W	-321.50	4.51
6097.00	30.39	6.15	6023.52	413.05 N	353.03 W	-315.99	6.39
6191.00	37.54	29.06	6101.75	461.98 N	336.48 W	-295.27	15.48
6286.00	45.86	51.38	6173.02	508.89 N	295.49 W	-250.38	17.81
6381.00	45.53	60.19	6239.45	547.05 N	239.39 W	-191.19	6.64
6475.00	44.01	68.34	6306.24	575.80 N	179.89 W	-129.43	6.31
6570.00	50.48	77.90	6370.78	595.71 N	113.23 W	-61.31	10.03
6665.00	59.60	82.40	6425.18	608.84 N	36.61 W	16.16	10.35
6759.00	68.58	84.62	6466.22	618.32 N	47.31 E	100.59	9.79
6854.00	73.61	85.32	6496.99	626.19 N	136.81 E	190.44	5.34
6975.00	88.00	89.00	6516.28	632.01 N	255.78 E	309.46	12.26

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 85.04 DEGREES (GRID)
A TOTAL CORRECTION OF 7.32 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6975.00 FEET
IS 681.80 FEET ALONG 22.03 DEGREES (GRID)

Final survey is a projection to the bit at TD.