

1 : 240

[illegible]

## WELL INFORMATION

MWD Run Number	100	200			
Date run completed	19-Dec-13	20-Dec-13			
Rig Bit Number	100	200			
Bit Size (in)	8.750	8.750			
Tool Nominal OD (in)	6.750	6.750			
Log Start Depth (TVD, ft)	838.99	5,864.50			
Log End Depth (TVD, ft)	5,864.50	6,637.35			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	18-Dec-13 13:15	19-Dec-13 15:45			
Drill/Wipe End Date and Time	19-Dec-13 06:30	20-Dec-13 15:00			
Min Inc (deg) @ Depth (TVD, ft)	0.15 @ 4,572.69	2.51 @ 5,942.45			
Max Inc (deg) @ Depth (TVD, ft)	13.08 @ 2,595.03	78.93 @ 6,628.68			
Bit TFA(in2) / Bit Type	0.75 / PDC	0.90 / PDC			
Flow Rate (gpm)	569.00	539.00			
Max AV (fpm) / CV (fpm) @ MWD	405.9 / 405.9	405.9 / 405.9			
Fluid Type	Fresh Water Gel	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	9.40 / 34.00	10.53 / 41.00			
Filtrate CL (ppm)	3,000.00	3,000.00			
pH / Fluid Loss (mptm)	8.70 / N/A	9.60 / N/A			
PV (cP) / YP (lbf2)	6 / 4.00	12 / 11.00			
% Solids / % Sand	7.00 / 0.65	11.50 / 0.35			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (in F) / S	159.45 / PCM	159.45 / PCM			

Max Tool Temp (degF) / Source	158.47 / PCM	158.47 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Robret Ley	Robret Ley			
Customer Representative	Charles Collver	Charles Collver			

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.84	5.84			
Sub Serial Number	11341341	11341341			
Insert Serial Number	11680106	11680106			
Date and Time Initialized	18-Dec-13 07:30	18-Dec-13 07:30:54			
Date and Time Read	20-Dec-13 21:17	20-Dec-13 21:08			
ECMB SW Version	N/A	N/A			

### Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	59.00	57.00			
Software Version	6.21	6.21			
Sub Serial Number	11341341	11341341			
Sonde Serial Number	12174582	12174582			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	9.64	236.20			

### Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	51.98	50.42			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11341341	11341341			
Insert/Sonde Serial Number	12037396	12037396			

## REMARKS

1. All depths are true vertical depths and are calibrated to the driller' pipe tally and are measured 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. The Following smoothing parameters have been applied to the data"

PGXR (Gamma Ray CG):

Interval Resolution: 0.5 feet

Coercion Distance: 0.6 feet

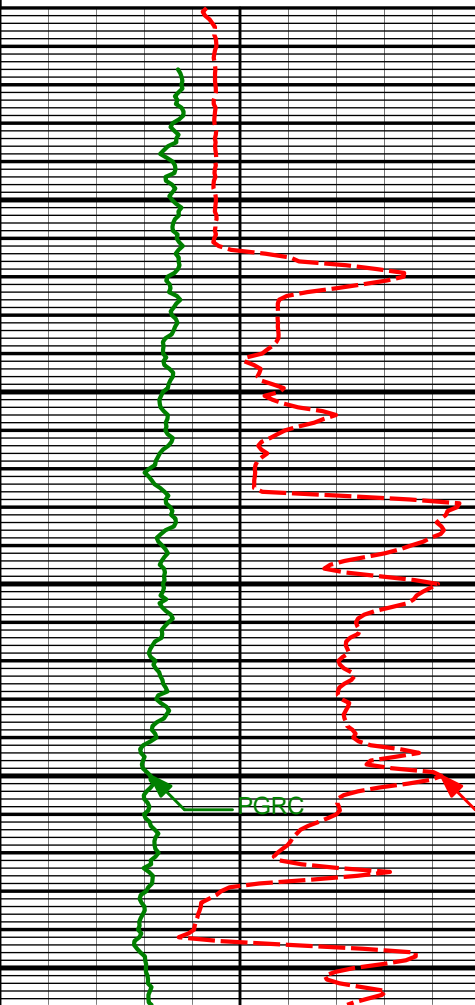
Gap Fill: 3.0 feet

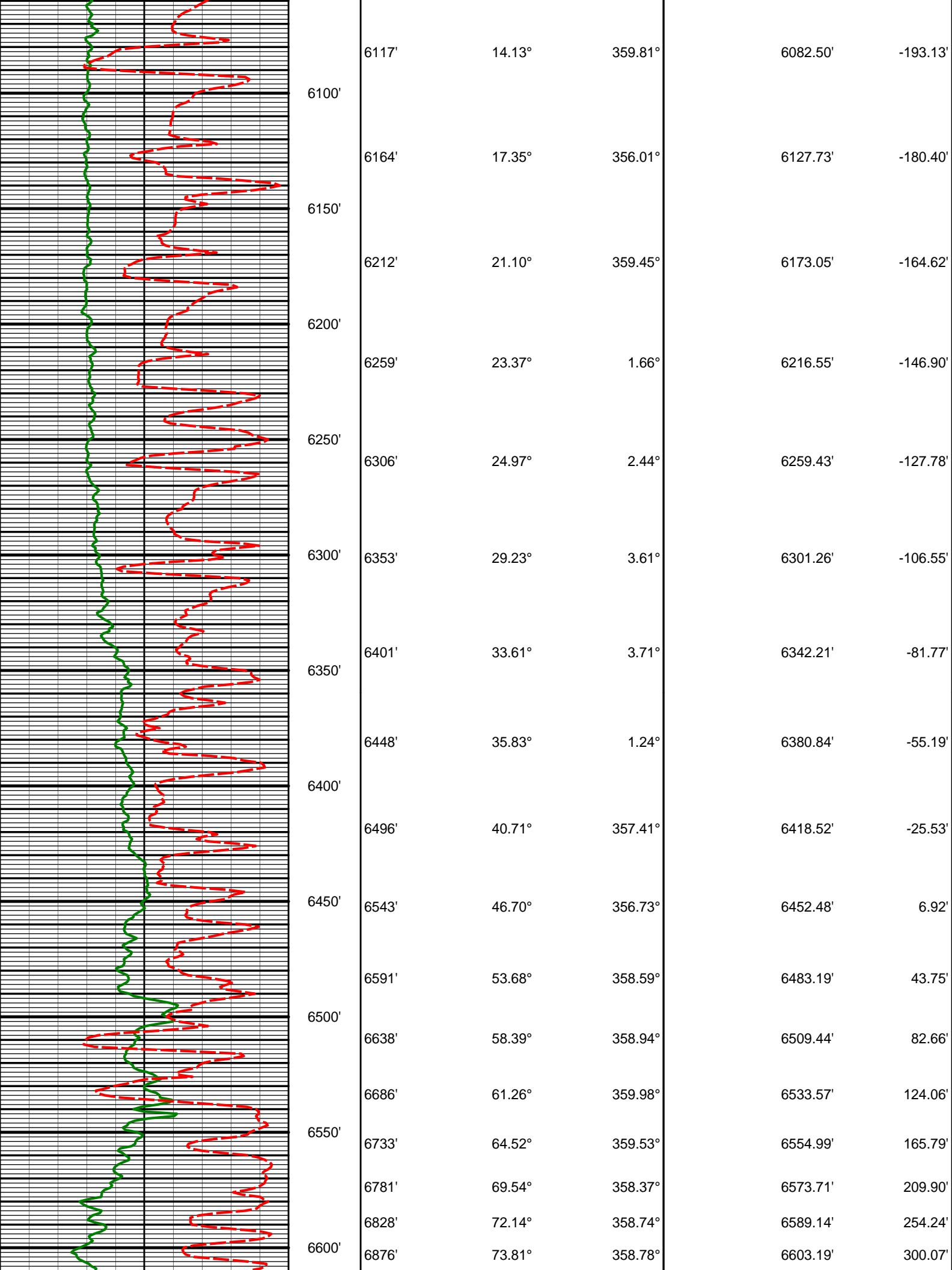
ROPA (Rate of Penetration):

Interval Resolution: 0.5 feet

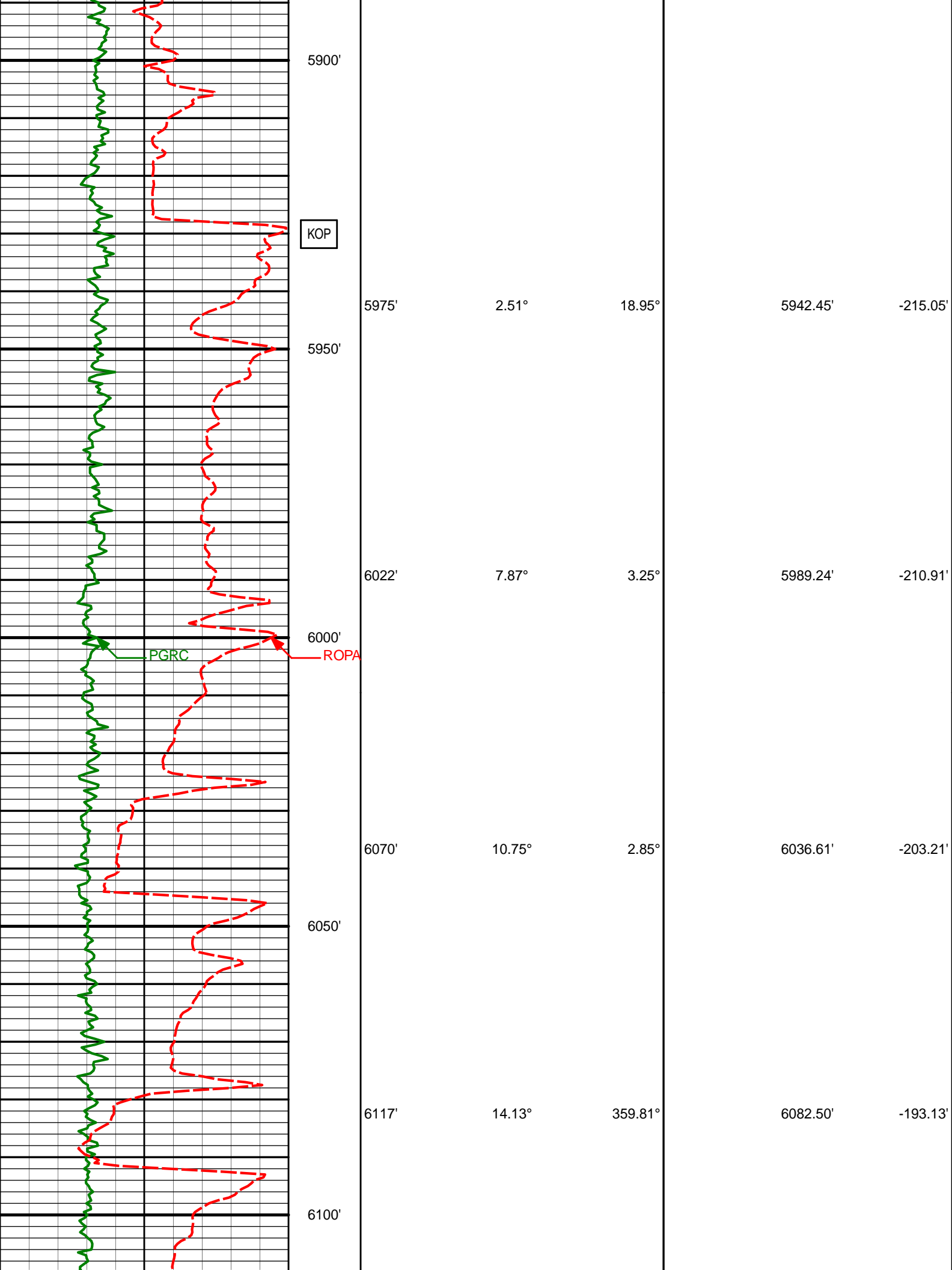
Coercion Distance: 1.2 feet

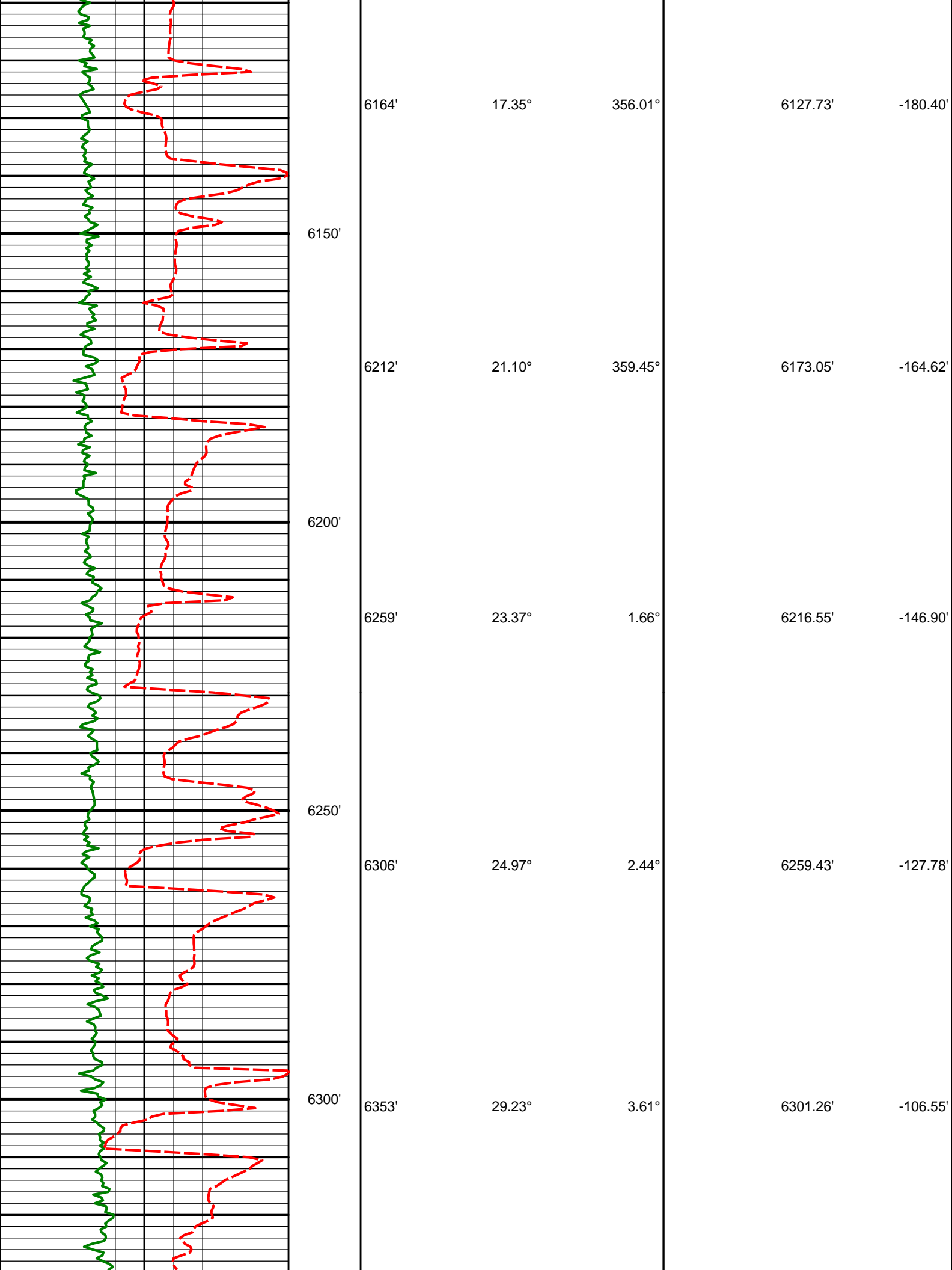
## WARRANTY

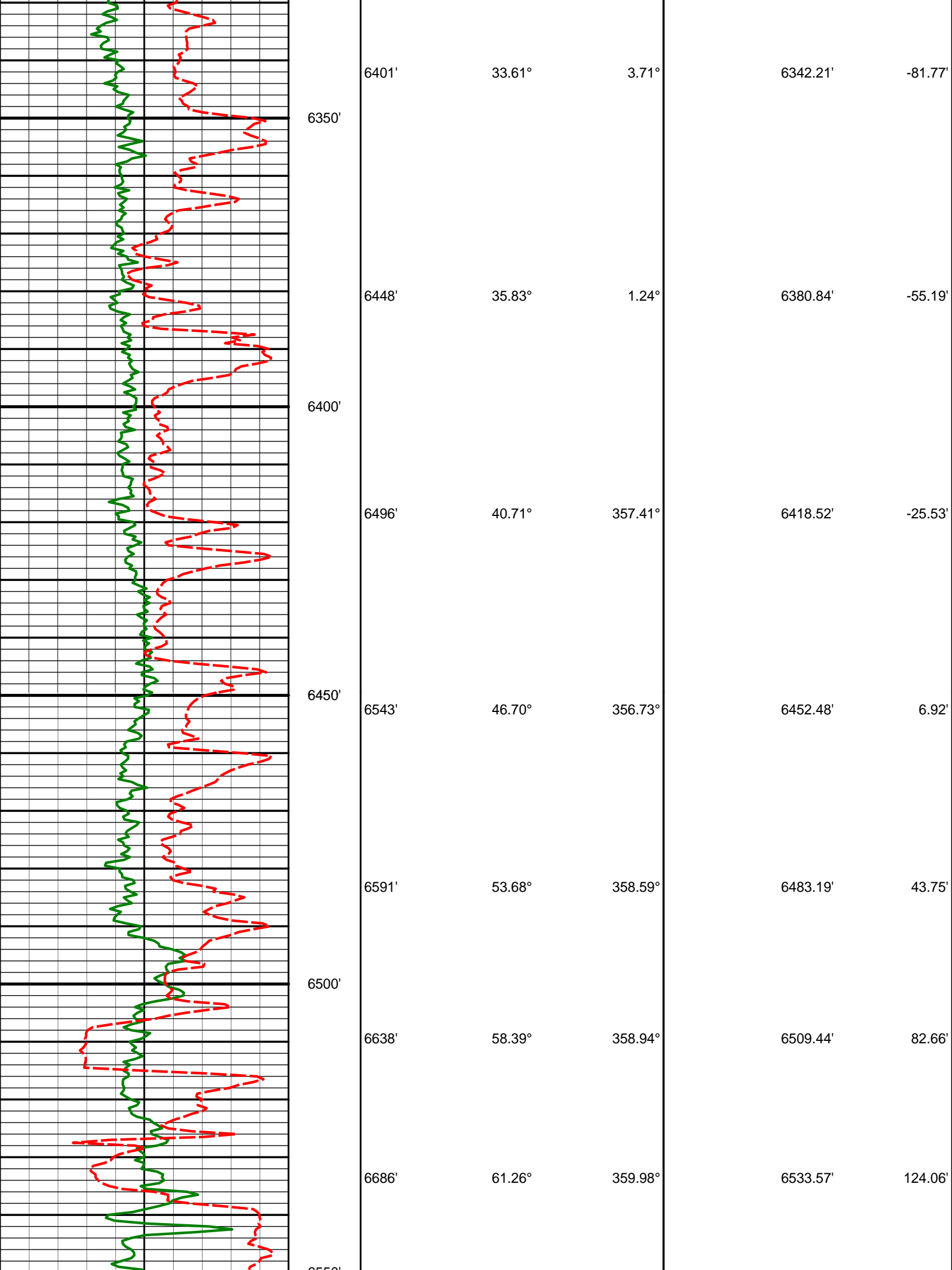
Gamma Ray (PGXC) (Api)							
0 300							
Avg Rate of Penetration feet per hr		Feet	Depth	Inc	Azm	TVD	Vsec
600 0							
		5838'	5838'	0.63°	73.14°	5805.50'	-217.97'
		5850'					
		Run 200					
		5900'					
		KOP					
		5975'	5975'	2.51°	18.95°	5942.45'	-215.05'
		5950'					
		6022'	6022'	7.87°	3.25°	5989.24'	-210.91'
		6000'					
PGRC		ROPA					
		6070'	6070'	10.75°	2.85°	6036.61'	-203.21'
		6050'					



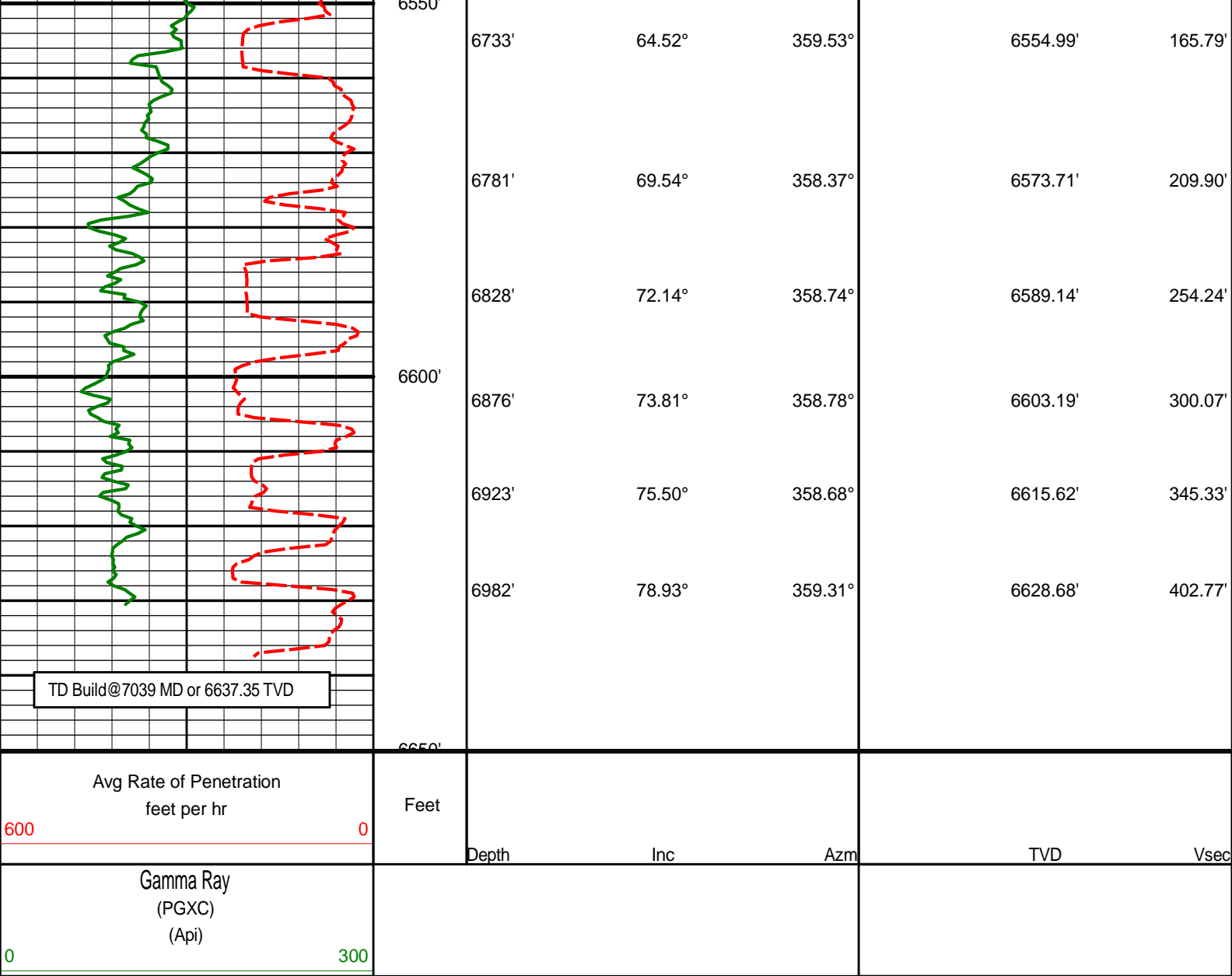
		6923' 6982'	75.50° 78.93°	358.68° 359.31°	6615.62' 6628.68'	345.33' 402.77'
TD Build @ 7039 MD or 6637.35 TVD		6650'				
Avg Rate of Penetration feet per hr 600 0		Feet				
Gamma Ray (PGXC) (Api) 0 300		Depth	Inc	Azm	TVD	Vsec
<div style="text-align: center;"> <h1 style="color: red;">HALLIBURTON</h1> <h2 style="color: black;">TVD Detail Log 1:240</h2> </div>						
Gamma Ray (PGXC) (Api) 0 300						
Avg Rate of Penetration feet per hr 600 0		Feet				
		Depth	Inc	Azm	TVD	Vsec
		5838'	0.63°	73.14°	5805.50'	-217.97'
		5850'				
Run 200						











## DIRECTIONAL SURVEY REPORT

Noble Energy  
Guttersen Stata DD17-79HN  
Wattenberg  
Weld Colorado  
USA  
CA-XX-0900894767

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
249.00	0.60	187.22	249.00	1.29 S	0.16 W	-1.28	0.24
502.00	0.20	348.72	501.99	2.17 S	0.42 W	-2.14	0.31
750.00	0.50	121.52	749.99	2.32 S	0.42 E	-2.34	0.26
814.00	0.30	114.52	813.99	2.53 S	0.81 E	-2.58	0.32
918.00	0.39	207.32	917.99	2.96 S	0.90 E	-3.02	0.49
1011.00	0.23	106.60	1010.99	3.30 S	0.93 E	-3.36	0.53
1104.00	0.65	187.72	1103.98	3.87 S	1.04 E	-3.94	0.70
1197.00	0.42	130.22	1196.98	4.61 S	1.23 E	-4.69	0.59
1290.00	0.58	153.93	1289.98	5.25 S	1.70 E	-5.36	0.27
1383.00	0.72	172.21	1382.97	6.25 S	1.98 E	-6.38	0.27
1476.00	0.83	155.33	1475.96	7.44 S	2.34 E	-7.59	0.27
1571.00	2.45	263.34	1570.93	8.30 S	0.61 E	-8.32	2.97
1665.00	4.41	255.40	1664.76	9.45 S	4.89 W	-9.06	2.14
1760.00	7.04	238.10	1759.28	13.44 S	13.36 W	-12.41	3.28

1855.00	9.04	232.90	1853.35	21.02 S	24.25 W	-19.16	2.24
1950.00	10.82	234.90	1946.92	30.65 S	37.50 W	-27.78	1.91
2044.00	12.79	233.00	2038.93	41.98 S	53.03 W	-37.92	2.13
2139.00	12.57	233.53	2131.61	54.45 S	69.73 W	-49.12	0.26
2234.00	12.22	233.54	2224.40	66.56 S	86.13 W	-59.98	0.37
2329.00	11.81	230.21	2317.32	78.76 S	101.69 W	-70.99	0.85
2423.00	12.30	230.89	2409.25	91.23 S	116.84 W	-82.30	0.54
2518.00	11.49	230.76	2502.21	103.60 S	132.02 W	-93.50	0.85
2613.00	13.08	230.66	2595.03	116.40 S	147.66 W	-105.11	1.68
2708.00	12.49	230.26	2687.67	129.78 S	163.88 W	-117.25	0.63
2803.00	11.87	225.39	2780.54	143.21 S	178.74 W	-129.54	1.26
2898.00	11.54	227.99	2873.56	156.44 S	192.76 W	-141.69	0.66
2993.00	11.21	227.68	2966.70	169.01 S	206.64 W	-153.20	0.36
3088.00	9.96	229.08	3060.08	180.61 S	219.67 W	-163.79	1.34
3183.00	8.25	225.66	3153.88	190.76 S	230.76 W	-173.09	1.88
3277.00	7.76	223.70	3246.96	200.06 S	239.97 W	-181.68	0.60
3372.00	6.46	223.90	3341.23	208.55 S	248.10 W	-189.54	1.38
3467.00	5.77	234.28	3435.69	215.18 S	255.68 W	-195.60	1.37
3562.00	5.57	229.71	3530.23	220.95 S	263.08 W	-200.80	0.52
3657.00	3.76	225.11	3624.91	226.13 S	268.80 W	-205.54	1.94
3752.00	1.59	225.34	3719.80	229.26 S	271.95 W	-208.43	2.28
3847.00	1.40	243.88	3814.77	230.70 S	273.93 W	-209.71	0.55
3941.00	1.54	235.21	3908.74	231.92 S	275.99 W	-210.78	0.28
4036.00	0.96	308.48	4003.72	232.16 S	277.66 W	-210.89	1.64
4131.00	0.47	320.08	4098.71	231.37 S	278.53 W	-210.04	0.53
4226.00	0.32	209.97	4193.71	231.30 S	278.92 W	-209.94	0.69
4321.00	0.79	215.45	4288.71	232.06 S	279.43 W	-210.66	0.51
4415.00	0.71	210.15	4382.70	233.09 S	280.10 W	-211.64	0.12
4510.00	0.83	188.78	4477.69	234.29 S	280.50 W	-212.80	0.33
4605.00	0.15	221.98	4572.69	235.06 S	280.69 W	-213.56	0.75
4700.00	1.12	228.32	4667.68	235.77 S	281.47 W	-214.21	1.01
4795.00	1.36	232.64	4762.66	237.07 S	283.06 W	-215.39	0.28
4890.00	2.24	229.88	4857.61	238.96 S	285.37 W	-217.10	0.93
4984.00	0.86	190.41	4951.57	240.83 S	286.91 W	-218.85	1.78
5079.00	0.62	189.51	5046.57	242.03 S	287.12 W	-220.04	0.25
5174.00	0.50	220.85	5141.56	242.85 S	287.48 W	-220.83	0.34
5269.00	0.70	79.42	5236.56	243.06 S	287.17 W	-221.05	1.20
5364.00	0.79	86.81	5331.55	242.91 S	285.95 W	-221.00	0.13
5459.00	0.94	37.49	5426.54	242.26 S	284.82 W	-220.43	0.77
5554.00	0.81	69.65	5521.53	241.40 S	283.71 W	-219.66	0.53
5649.00	0.93	63.29	5616.52	240.82 S	282.39 W	-219.18	0.16
5744.00	0.71	42.77	5711.51	240.04 S	281.30 W	-218.48	0.38
5838.00	0.63	73.14	5805.50	239.47 S	280.41 W	-217.97	0.38
5975.00	2.51	18.95	5942.45	236.41 S	278.72 W	-215.05	1.61
6022.00	7.87	3.25	5989.24	232.22 S	278.20 W	-210.91	11.68
6070.00	10.75	2.85	6036.61	224.46 S	277.79 W	-203.21	6.00
6117.00	14.13	359.81	6082.50	214.35 S	277.59 W	-193.13	7.32
6164.00	17.35	356.01	6127.73	201.62 S	278.10 W	-180.40	7.20
6212.00	21.10	359.45	6173.05	185.83 S	278.68 W	-164.62	8.16
6259.00	23.37	1.66	6216.55	168.05 S	278.49 W	-146.90	5.14
6306.00	24.97	2.44	6259.43	148.82 S	277.80 W	-127.78	3.48
6353.00	29.23	3.61	6301.26	127.45 S	276.66 W	-106.55	9.14
6401.00	33.61	3.71	6342.21	102.48 S	275.06 W	-81.77	9.13
6448.00	35.83	1.24	6380.84	75.74 S	273.92 W	-55.19	5.59
6496.00	40.71	357.41	6418.52	46.04 S	274.32 W	-25.53	11.31
6543.00	46.70	356.73	6452.48	13.62 S	275.99 W	6.92	12.78
6591.00	53.68	358.59	6483.19	23.20 N	277.47 W	43.75	14.83
6638.00	58.39	358.94	6509.44	62.16 N	278.30 W	82.66	10.04
6686.00	61.26	359.98	6533.57	103.65 N	278.69 W	124.06	6.26
6733.00	64.52	359.53	6554.99	145.48 N	278.87 W	165.79	6.99
6781.00	69.54	358.37	6573.71	189.65 N	279.69 W	209.90	10.71
6828.00	72.14	358.74	6589.14	234.03 N	280.81 W	254.24	5.59
6876.00	73.81	358.78	6603.19	279.91 N	281.80 W	300.07	3.48
6923.00	75.50	358.68	6615.62	325.23 N	282.80 W	345.33	3.60
6982.00	78.93	359.31	6628.68	382.74 N	283.81 W	402.77	5.89

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 355.74 DEGREES (GRID)

A TOTAL CORRECTION OF 7.72 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6982.00 FEET  
IS 476.49 FEET ALONG 323.44 DEGREES (GRID)

Tie-In @ Surface

Surveys at 249 ft, 502 ft, 750 ft, and 814 were taken and provided by HP 322 while they were drilling the surface hole and have been converted from magnetic north to grid north.

Date Printed:23 December 2013