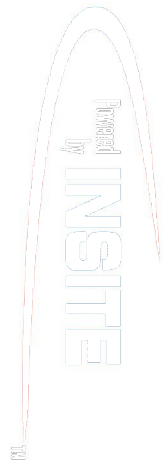


**PCDC - Pressure Case Directional
PCGK - Pressure Case Gamma**

1 : 240

Country		: USA						
Field		: Wattenberg						
Location		: Lat: 40° 13' 7.93" North Long: 104° 28' 10.81" West						
Well		: Guttersen State DD17-79-1HN						
Company		: Noble Energy						
Rig		: H&P 322						
LOCATION		Latitude : 40° 13' 7.93" North Longitude : 104° 28' 10.81" West		Other Services Directional Drilling				
		UTM Easting = 3287717.938 ft UTM Northing = 1324247.835 ft						
Permanent Datum		: Ground Level		Elevation : 4820.00 ft		Elev. KB N/A		
Log Measured From		: Drill Floor		24.00 ft Above Permanent Datum		DF 4844.00 ft GL 4820.00 ft WD N/A		
Drilling Measured From		: Drill Floor		TVD LOG				
Depth Logged		: 849.98 ft To 6,590.35 ft		Unit No. : 11210425		Job No. :CA-XX-0900894765		
Date Logged		: 09-Dec-13 To 12-Dec-13		Plot Type : Final				
Total Depth MD		: 6,973.00 ft TVD: 6,590.35 ft		Plot Date : 17-Dec-13				
Spud Date		: 08-Dec-13						
Run No.		Borehole Record (TVD)		Run No.		Borehole Record (TVD)		
		Size	From	To		Size	From	To
2		8.750 in	849.98 ft	5752.26 ft				
3		8.750 in	5752.26 ft	6590.35 ft				

WELL INFORMATION

MWD Run Number	100	200		
Date run completed	11-Dec-13	12-Dec-13		
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)	850.98	5,811.24		
Log End Depth (TVD, ft)	5,811.24	6,590.35		
Drill or Wipe	Drill	Drill		
Drill/Wipe Start Date and Time	10-Dec-13 06:00	11-Dec-13 05:30		
Drill/Wipe End Date and Time	10-Dec-13 21:15	12-Dec-13 03:30		
Min Inc (deg) @ Depth (TVD, ft)	0.00 @ 0.00	1.90 @ 5,810.24		
Max Inc (deg) @ Depth (TVD, ft)	13.28 @ 2,696.00	85.00 @ 6,590.35		
Bit TFA(in2) / Bit Type	0.75 / PDC	0.90 / PDC		
Flow Rate (gpm)	541.41	534.90		
Max AV (fpm) / CV (fpm) @ MWD	462.9 / 462.9	405.9 / 405.9		
Fluid Type	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	9.00 / 34.00	10.75 / 38.00		
Filtrate CL (ppm)	22.00	2,400.00		
pH / Fluid Loss (mptm)	8.20 / N/A	9.60 / N/A		
PV (cP) / YP (Ihf2)	3 / 3.00	10 / 9.00		
% Solids / % Sand	0.90 / 0.10	11.20 / 0.50		
% 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 (degF) / Source	145.90 / PCM	162.80 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Robert Ley	Robert Ley			
Customer Representative	Jeremy Stolz	Jeremy Stolz			

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	09-Dec-13 11:42	09-Dec-13 11:42			
Date and Time Read	12-Dec-13 09:50	12-Dec-13 09:40			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	59.00	56.00			
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)	309.60	93.08			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	51.98	49.41			
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

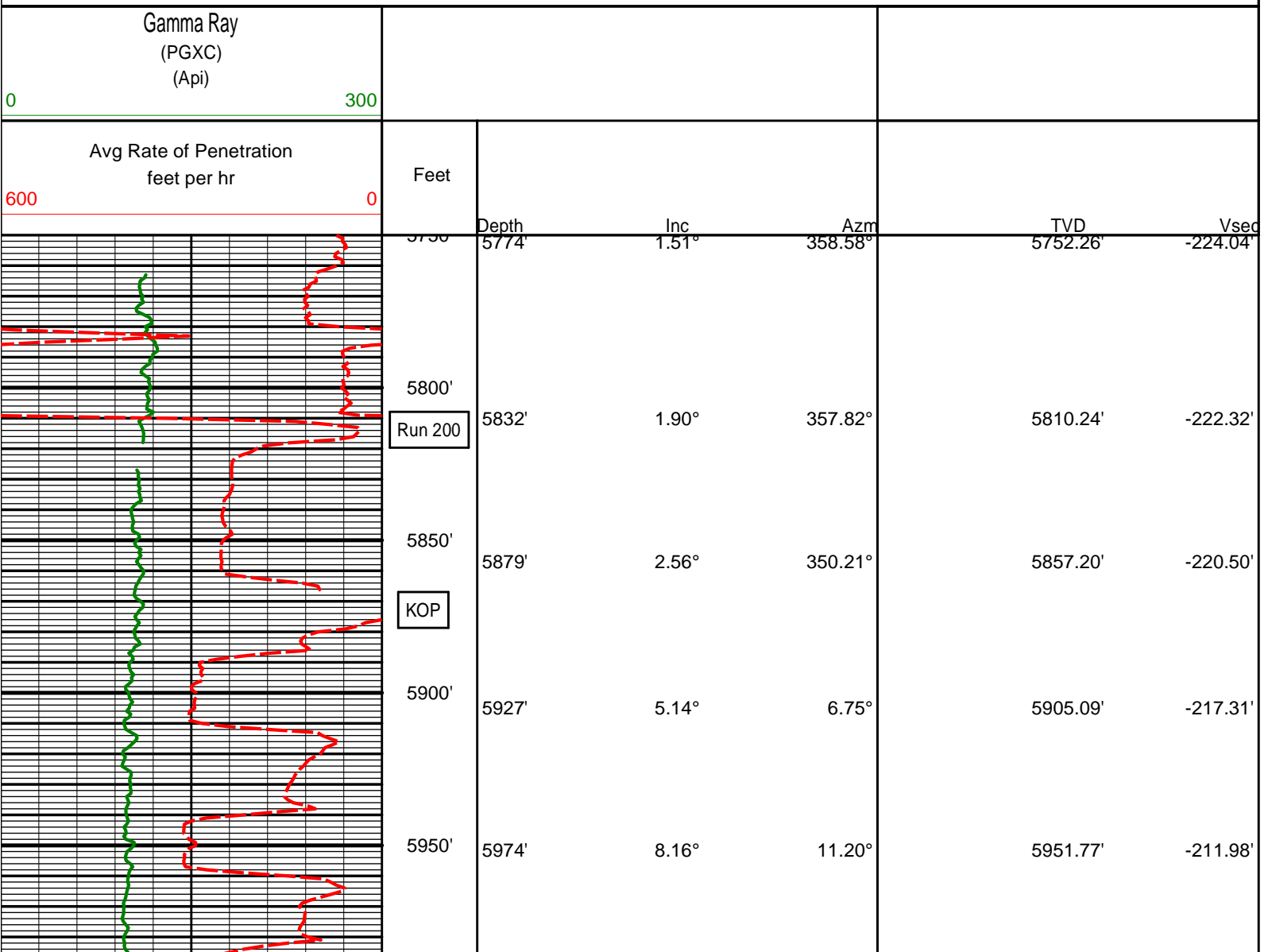
5. Gamma from 5816 ft to 5829 ft TVD and ROP from 5865 ft to 5877 ft TVD is missing due to communication error with Pason.

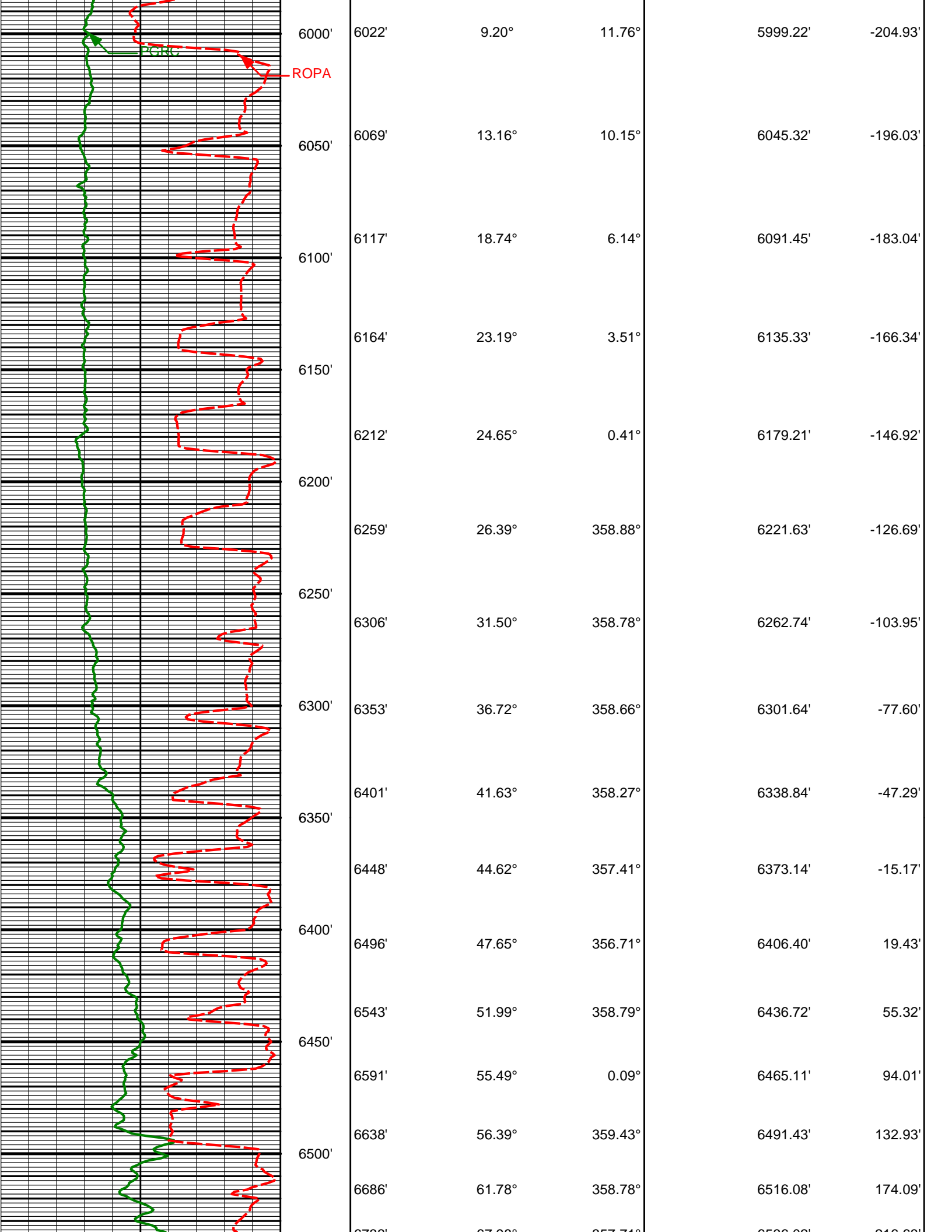
WARRANTY

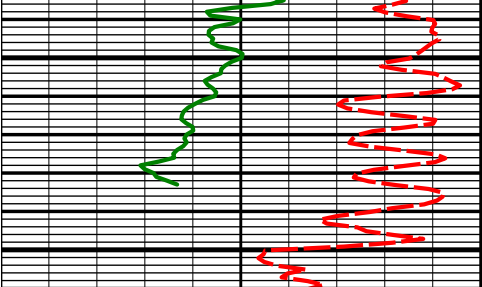
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TVD Detail Log 1:600



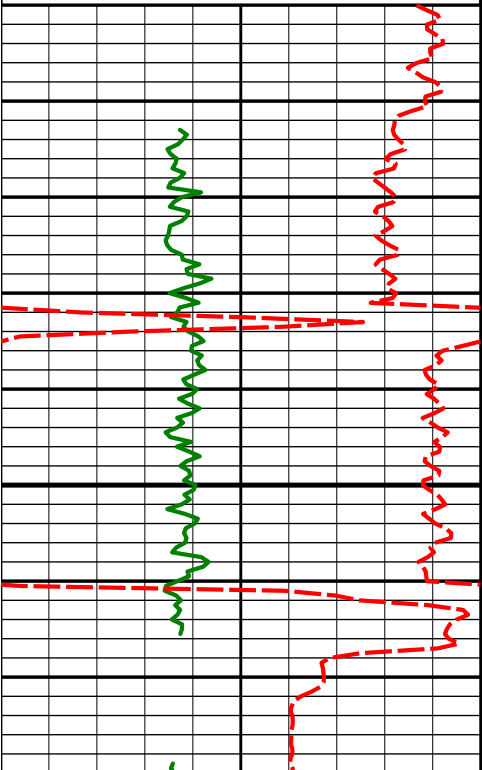


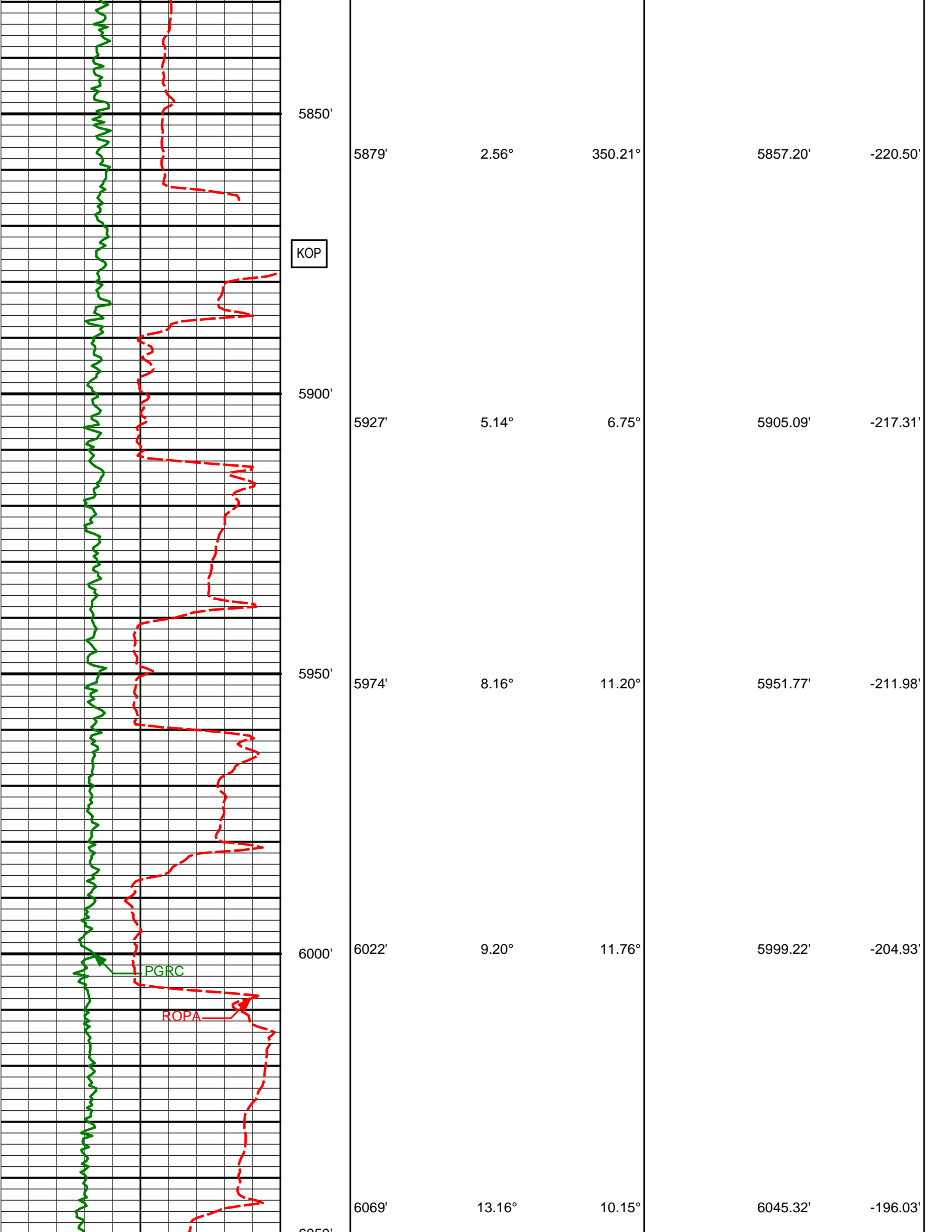
	6550'	6733'	67.98°	357.71°	6536.02'	216.63'
		6781'	73.88°	356.93°	6551.70'	261.97'
		6828'	76.91°	356.86°	6563.55'	307.43'
		6876'	78.51°	356.92°	6573.77'	354.31'
	6600'	6917'	79.66°	357.38°	6581.53'	394.56'

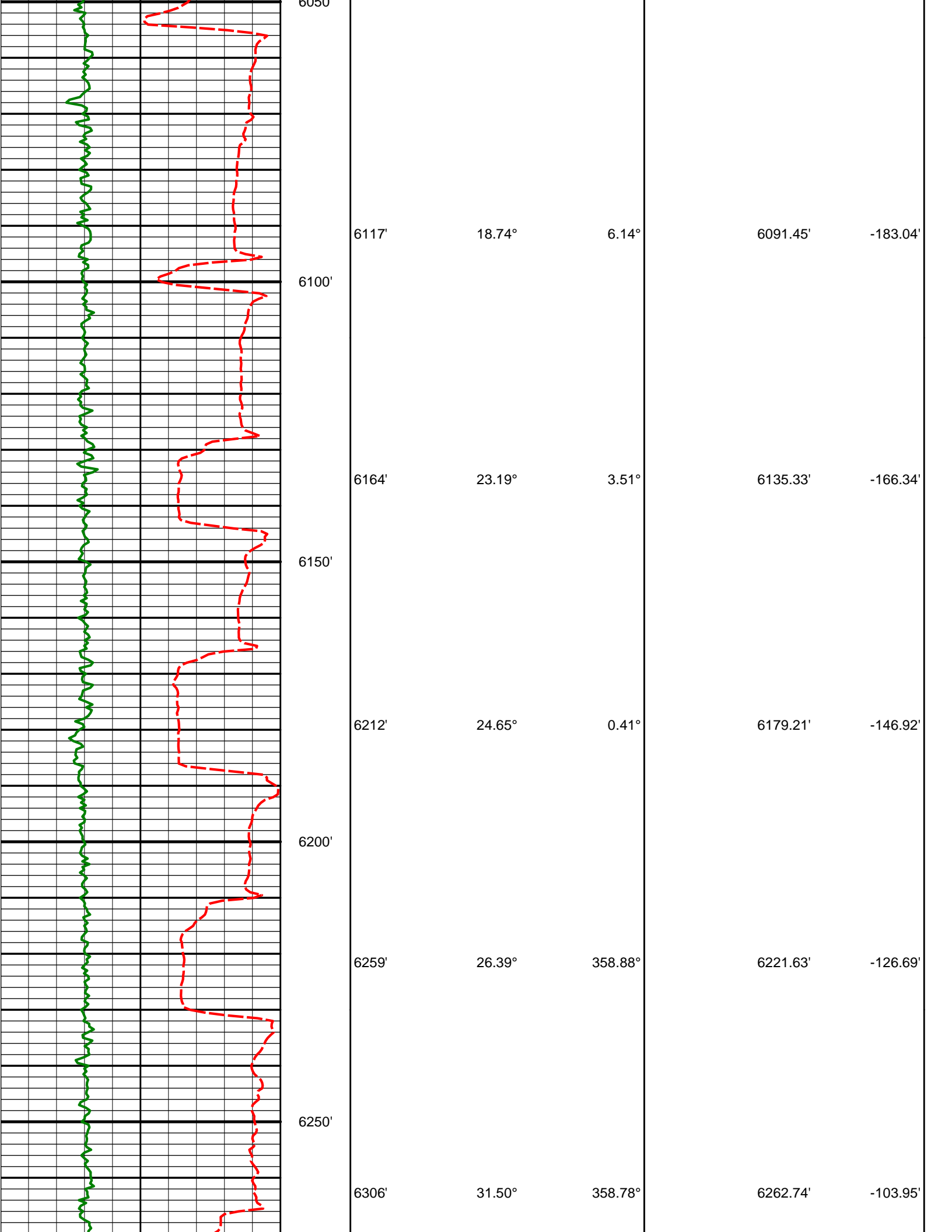
Avg Rate of Penetration feet per hr 600 0	Feet					
		Depth	Inc	Azm	TVD	Vsec
Gamma Ray (PGXC) (Api) 0 300						

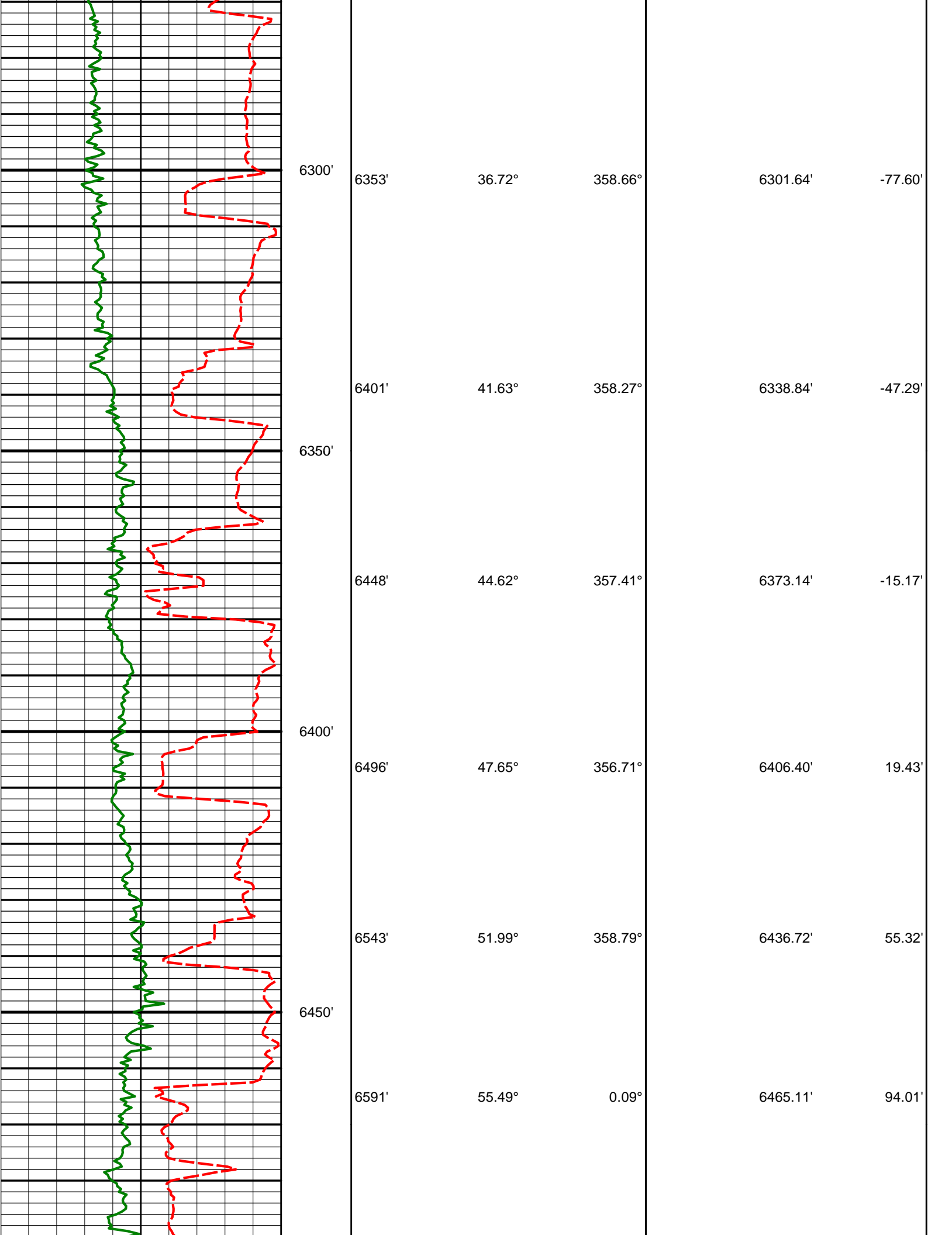
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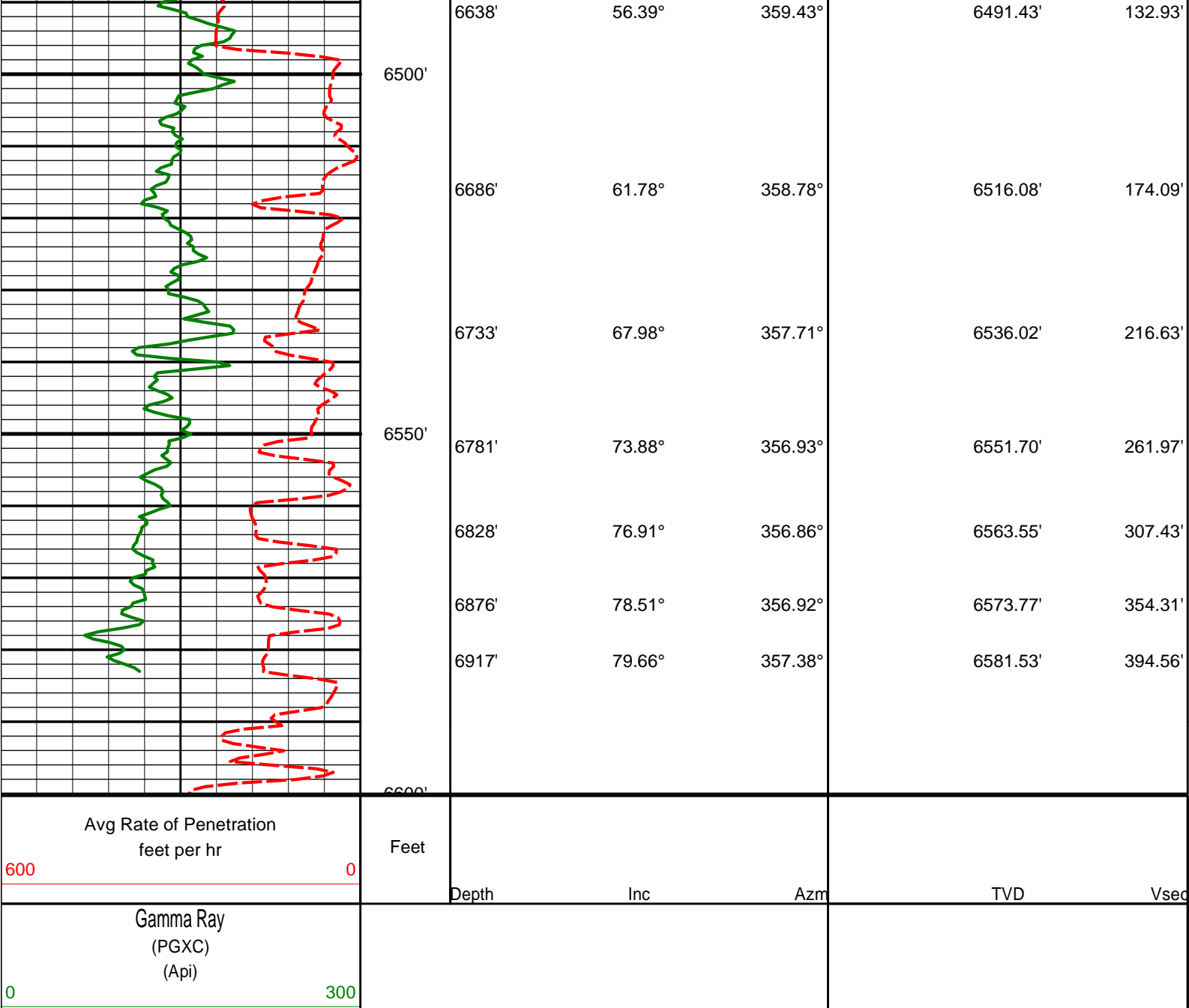
TVD Detail Log 1:240

Gamma Ray (PGXC) (Api) 0 300						
Avg Rate of Penetration feet per hr 600 0	Feet					
		Depth	Inc	Azm	TVD	Vsec
	5750'	5774'	1.51°	358.58°	5752.26'	-224.04'
	5800'					
	Run 200	5832'	1.90°	357.82°	5810.24'	-222.32'









DIRECTIONAL SURVEY REPORT

Noble Energy
Guttersen State DD17-79-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0900894765

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
240.00	0.60	318.30	240.00	0.94 N	0.84 W	0.96	0.25
502.00	0.10	186.70	501.99	1.74 N	1.78 W	1.79	0.26
750.00	0.50	15.60	749.99	2.56 N	1.51 W	2.61	0.24
850.00	0.80	0.90	849.98	3.68 N	1.38 W	3.72	0.34
918.00	0.64	18.04	917.98	4.51 N	1.26 W	4.55	0.40
1104.00	0.72	10.70	1103.96	6.64 N	0.72 W	6.66	0.07
1197.00	1.03	339.82	1196.95	8.00 N	0.90 W	8.02	0.59
1290.00	0.94	340.26	1289.94	9.50 N	1.44 W	9.54	0.09
1383.00	1.19	343.00	1382.92	11.13 N	1.98 W	11.19	0.27
1476.00	1.63	346.78	1475.90	13.34 N	2.57 W	13.42	0.49

1571.00	1.78	294.53	1570.86	15.27 N	4.22 W	15.39	1.59
1665.00	0.96	237.76	1664.83	15.46 N	6.22 W	15.64	1.58
1760.00	0.25	209.93	1759.83	14.85 N	7.00 W	15.05	0.79
1855.00	2.21	210.28	1854.80	13.08 N	8.03 W	13.32	2.06
1949.00	3.69	205.97	1948.68	8.80 N	10.26 W	9.11	1.58
2044.00	6.19	196.84	2043.32	1.16 N	13.08 W	1.55	2.75
2139.00	7.26	195.08	2137.66	9.54 S	16.13 W	-9.05	1.15
2234.00	8.64	190.87	2231.75	22.35 S	19.04 W	-21.76	1.58
2329.00	10.54	193.01	2325.41	37.83 S	22.34 W	-37.13	2.03
2423.00	13.02	192.55	2417.43	56.54 S	26.58 W	-55.72	2.64
2518.00	11.53	190.61	2510.25	76.32 S	30.65 W	-75.36	1.63
2613.00	11.85	189.34	2603.28	95.28 S	33.99 W	-94.21	0.44
2708.00	13.28	190.90	2696.00	115.63 S	37.63 W	-114.44	1.54
2803.00	12.87	190.20	2788.54	136.76 S	41.57 W	-135.44	0.46
2898.00	12.36	187.32	2881.25	157.26 S	44.74 W	-155.84	0.85
2993.00	10.60	186.51	2974.34	176.03 S	47.02 W	-174.53	1.86
3088.00	8.53	183.99	3068.02	191.74 S	48.51 W	-190.19	2.22
3183.00	6.29	183.18	3162.22	203.96 S	49.29 W	-202.38	2.36
3277.00	4.21	184.26	3255.82	212.55 S	49.83 W	-210.94	2.22
3372.00	1.91	186.36	3350.68	217.60 S	50.26 W	-215.98	2.42
3467.00	2.17	229.39	3445.62	220.35 S	51.80 W	-218.68	1.60
3562.00	0.63	178.48	3540.59	222.04 S	53.15 W	-220.33	1.93
3657.00	1.91	198.18	3635.57	224.07 S	53.63 W	-222.34	1.41
3752.00	1.36	158.41	3730.53	226.62 S	53.71 W	-224.90	1.29
3847.00	0.44	104.09	3825.52	227.76 S	52.94 W	-226.06	1.22
3941.00	0.25	130.38	3919.52	227.98 S	52.43 W	-226.30	0.26
4036.00	0.71	169.91	4014.51	228.70 S	52.17 W	-227.02	0.57
4131.00	1.36	85.86	4109.50	229.19 S	50.94 W	-227.55	1.55
4226.00	0.64	47.04	4204.49	228.75 S	49.43 W	-227.15	1.00
4321.00	0.22	97.55	4299.49	228.41 S	48.85 W	-226.83	0.56
4415.00	0.62	350.34	4393.48	227.94 S	48.76 W	-226.36	0.76
4510.00	0.60	14.67	4488.48	226.95 S	48.72 W	-225.38	0.27
4605.00	0.13	262.13	4583.48	226.49 S	48.70 W	-224.92	0.69
4700.00	0.70	178.81	4678.47	227.09 S	48.79 W	-225.51	0.74
4795.00	1.28	355.28	4773.47	226.61 S	48.86 W	-225.03	2.09
4890.00	1.47	350.82	4868.44	224.35 S	49.15 W	-222.76	0.23
4984.00	1.91	312.23	4962.40	222.10 S	50.50 W	-220.47	1.27
5079.00	0.89	225.34	5057.38	221.55 S	52.20 W	-219.87	2.17
5174.00	1.82	219.66	5152.35	223.23 S	53.68 W	-221.50	0.99
5269.00	0.96	292.01	5247.33	224.09 S	55.39 W	-222.32	1.88
5364.00	1.10	223.60	5342.32	224.45 S	56.76 W	-222.63	1.22
5459.00	1.13	195.63	5437.30	226.01 S	57.63 W	-224.17	0.57
5554.00	0.66	170.35	5532.29	227.45 S	57.80 W	-225.60	0.64
5649.00	0.57	84.95	5627.29	227.94 S	57.23 W	-226.11	0.88
5744.00	1.51	355.96	5722.27	226.65 S	56.85 W	-224.83	1.68
5774.00	1.51	358.58	5752.26	225.86 S	56.89 W	-224.04	0.23
5832.00	1.90	357.82	5810.24	224.14 S	56.95 W	-222.32	0.67
5879.00	2.56	350.21	5857.20	222.33 S	57.15 W	-220.50	1.53
5927.00	5.14	6.75	5905.09	219.13 S	57.08 W	-217.31	5.80
5974.00	8.16	11.20	5951.77	213.77 S	56.19 W	-211.98	6.51
6022.00	9.20	11.76	5999.22	206.67 S	54.74 W	-204.93	2.18
6069.00	13.16	10.15	6045.32	197.72 S	53.03 W	-196.03	8.44
6117.00	18.74	6.14	6091.45	184.67 S	51.24 W	-183.04	11.84
6164.00	23.19	3.51	6135.33	167.92 S	49.87 W	-166.34	9.69
6212.00	24.65	0.41	6179.21	148.48 S	49.22 W	-146.92	4.00
6259.00	26.39	358.88	6221.63	128.23 S	49.35 W	-126.69	3.96
6306.00	31.50	358.78	6262.74	105.50 S	49.82 W	-103.95	10.88
6353.00	36.72	358.66	6301.64	79.16 S	50.41 W	-77.60	11.11
6401.00	41.63	358.27	6338.84	48.86 S	51.23 W	-47.29	10.23
6448.00	44.62	357.41	6373.14	16.76 S	52.45 W	-15.17	6.48
6496.00	47.65	356.71	6406.40	17.80 N	54.23 W	19.43	6.41
6543.00	51.99	358.79	6436.72	53.67 N	55.62 W	55.32	9.82
6591.00	55.49	0.09	6465.11	92.36 N	55.98 W	94.01	7.63
6638.00	56.39	359.43	6491.43	131.30 N	56.15 W	132.93	2.23
6686.00	61.78	358.78	6516.08	172.46 N	56.80 W	174.09	11.29
6733.00	67.98	357.71	6536.02	214.97 N	58.11 W	216.63	13.36
6781.00	73.88	356.93	6551.70	260.27 N	60.24 W	261.97	12.38
6828.00	76.91	356.86	6563.55	305.68 N	62.70 W	307.43	6.44
6876.00	78.51	356.92	6573.77	352.50 N	65.25 W	354.31	3.35
6917.00	79.66	357.38	6581.53	392.71 N	67.25 W	394.56	3.01

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 358.27 DEGREES (GRID)
A TOTAL CORRECTION OF 7.73 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6917.00 FEET
IS 398.43 FEET ALONG 350.28 DEGREES (GRID)**

Tie-In @ Surface

Surveys at 240 ft, 502 ft, 750 ft, and 850 were taken and provided by HP 322 while they were drilling the surface hole.

Date Printed:17 December 2013