

PCG - Pressure Cased Gamma

1 : 600 / 1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100				
Date run completed	03-Jan-15				
Rig Bit Number	2				
Bit Size (in)	8.750				
Tool Nominal OD (in)	6.750				
Log Start Depth (MD, ft)	683.00				
Log End Depth (MD, ft)	6,950.00				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	01-Jan-15 15:45				
Drill/Wipe End Date and Time	03-Jan-15 06:18				
Min Inc (deg) @ Depth (MD, ft)	0.14 @ 2,122.00				
Max Inc (deg) @ Depth (MD, ft)	79.00 @ 6,892.00				
Bit TFA(in2) / Bit Type	0.91 / PDC				
Flow Rate (gpm)	599.08				
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A				
Fluid Type	Native/Spud Mud				
Density (ppg) / Viscosity (spqt)	8.60 / 30.00				
Filtrate CL (ppm)	1,500.00				
pH / Fluid Loss (mptm)	11.30 / 0				
PV (cP) / YP (lbf2)	3 / 5.00				
% Solids / % Sand	1.70 / 0.75				
% 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	125.50 / PDM				

Max Tool Temp (degF) / Source	165.58 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ N/A				
Lead MWD Engineer	Paul Sheets				
Customer Representative	Clifford Kester				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.93				
Sub Serial Number	11404272				
Insert Serial Number	11680745				
Date and Time Initialized	31-Dec-14 17:26				
Date and Time Read	03-Jan-15 14:25				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	55.73				
Software Version	6.21				
Sub Serial Number	11404272				
Sonde Serial Number	11297577				
Sensor ID Number	N/A				
Toolface Offset (deg)	30.00				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	50.63				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11404272				
Insert/Sonde Serial Number	11293301				

REMARKS

1. All depths are calibrated to the drillers 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 2" (1:600) logs - 1 ft. interval, 3 ft. coercion distance.
 - All 5" (1:240) logs - .5 ft. interval, .6 ft. coercion distance.
5. INSITE version 8.1.10

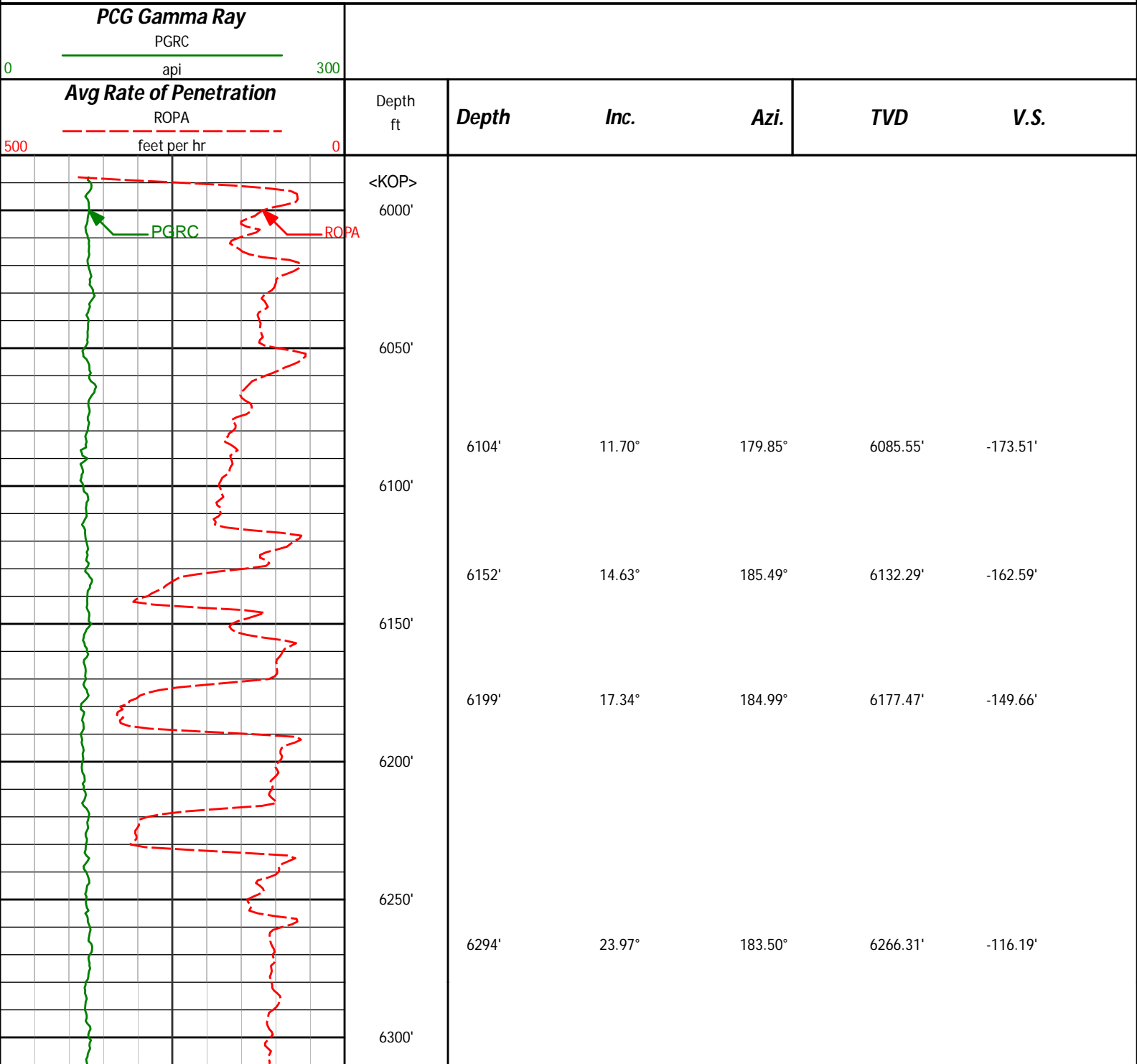
WARRANTY

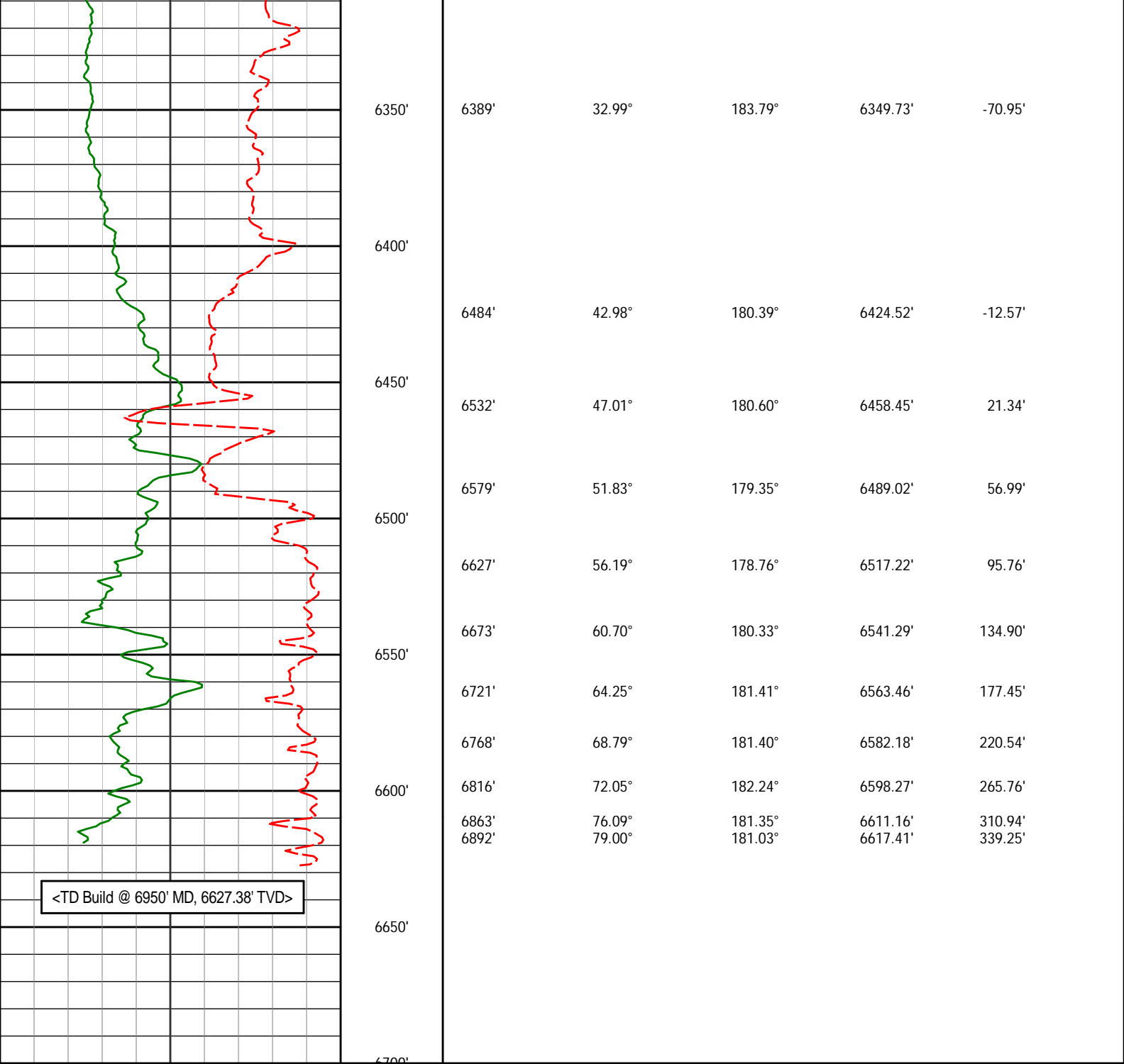
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HALLIBURTON
Sperry Drilling Services
TVD Detail Log 1:600

Noble Energy, Inc
Crow Creek AA01-785
H&P 315
T6N R63W

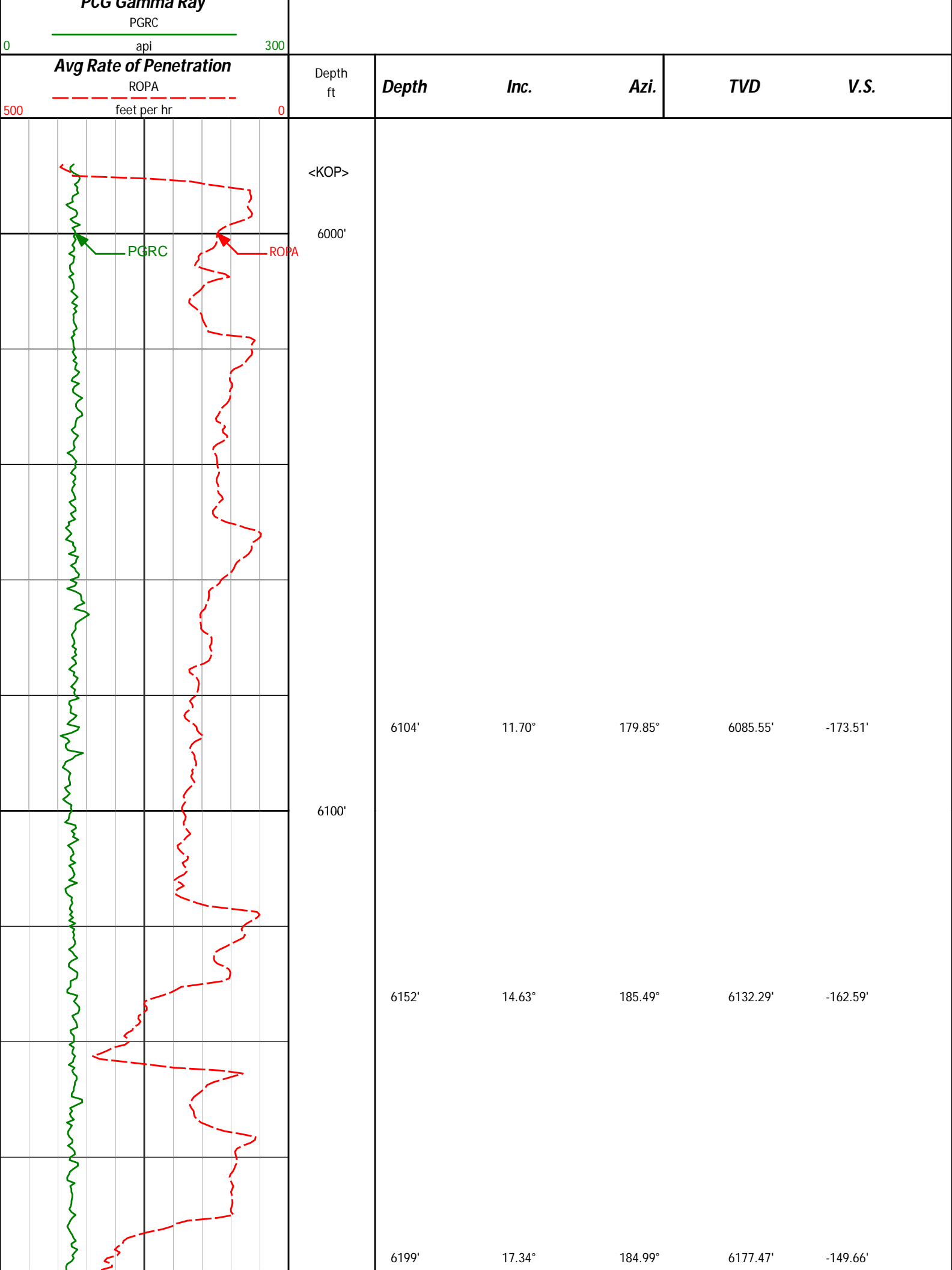


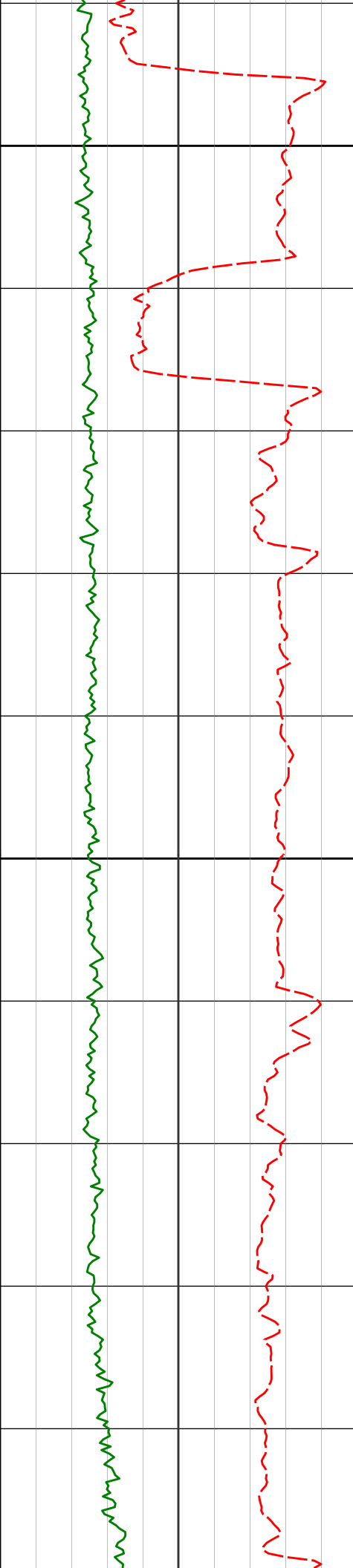


<div><div><div>Avg Rate of Penetration</div><div>ROPA</div><div>feet per hr</div></div><div><div>500</div><div>0</div></div></div>		Depth ft	Depth	Inc.	Azi.	TVD	V.S.					
<div><div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div></div><div><div>0</div><div>300</div></div></div>												

HALLIBURTON
Sperry Drilling Services
TVD Detail Log 1:240

Noble Energy, Inc
Crow Creek AA01-785
H&P 315
T6N R63W





6200'

6294'

23.97°

183.50°

6266.31'

-116.19'

6300'

6389'

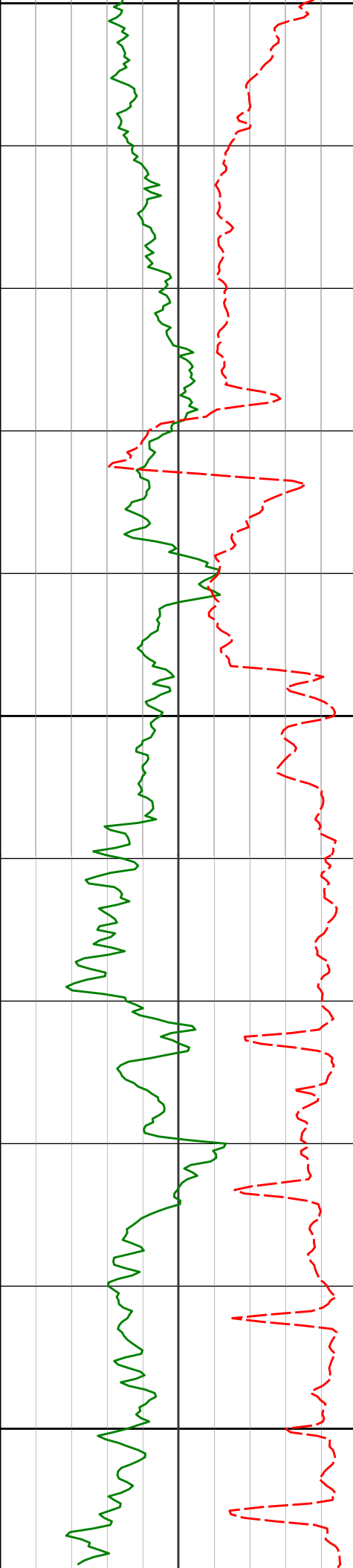
32.99°

183.79°

6349.73'

-70.95'

6400'



6400'

6500'

6600'

6484'	42.98°	180.39°	6424.52'	-12.57'
6532'	47.01°	180.60°	6458.45'	21.34'
6579'	51.83°	179.35°	6489.02'	56.99'
6627'	56.19°	178.76°	6517.22'	95.76'
6673'	60.70°	180.33°	6541.29'	134.90'
6721'	64.25°	181.41°	6563.46'	177.45'
6768'	68.79°	181.40°	6582.18'	220.54'
6816'	72.05°	182.24°	6598.27'	265.76'
6863'	76.09°	181.35°	6611.16'	310.94'
6892'	79.00°	181.03°	6617.41'	339.25'

4207.00	7.00	314.19	4193.49	151.84 N	136.48 W	-146.22	0.45
4302.00	6.06	314.59	4287.87	159.40 N	144.21 W	-153.45	0.98
4397.00	6.68	318.82	4382.29	167.08 N	151.42 W	-160.84	0.81
4492.00	6.05	320.07	4476.70	175.08 N	158.27 W	-168.55	0.67
4587.00	6.05	320.43	4571.17	182.78 N	164.68 W	-175.99	0.04
4681.00	5.92	321.68	4664.66	190.40 N	170.84 W	-183.36	0.20
4776.00	3.88	323.84	4759.31	196.85 N	175.78 W	-189.60	2.15
4871.00	3.35	320.65	4854.12	201.59 N	179.43 W	-194.19	0.60
4966.00	1.24	302.47	4949.04	204.28 N	182.06 W	-196.78	2.32
5061.00	1.23	293.16	5044.01	205.23 N	183.86 W	-197.66	0.21
5250.00	1.68	278.01	5232.95	206.42 N	188.46 W	-198.65	0.31
5345.00	1.63	285.85	5327.91	206.98 N	191.14 W	-199.11	0.24
5440.00	1.70	280.72	5422.87	207.61 N	193.82 W	-199.63	0.18
5535.00	1.39	203.04	5517.85	206.81 N	195.66 W	-198.76	2.06
5630.00	1.48	205.83	5612.82	204.65 N	196.65 W	-196.56	0.12
5724.00	1.43	211.14	5706.79	202.56 N	197.78 W	-194.42	0.15
5819.00	1.28	228.02	5801.76	200.83 N	199.18 W	-192.64	0.45
5914.00	1.29	227.49	5896.74	199.40 N	200.76 W	-191.14	0.02
5948.00	1.33	228.98	5930.73	198.88 N	201.35 W	-190.60	0.14
6104.00	11.70	179.85	6085.55	181.82 N	202.67 W	-173.51	6.97
6152.00	14.63	185.49	6132.29	170.92 N	203.24 W	-162.59	6.66
6199.00	17.34	184.99	6177.47	158.03 N	204.42 W	-149.66	5.76
6294.00	23.97	183.50	6266.31	124.63 N	206.83 W	-116.19	7.01
6389.00	32.99	183.79	6349.73	79.47 N	209.73 W	-70.95	9.49
6484.00	42.98	180.39	6424.52	21.12 N	211.67 W	-12.57	10.74
6532.00	47.01	180.60	6458.45	12.81 S	211.96 W	21.34	8.39
6579.00	51.83	179.35	6489.02	48.49 S	211.93 W	56.99	10.45
6627.00	56.19	178.76	6517.22	87.31 S	211.29 W	95.76	9.15
6673.00	60.70	180.33	6541.29	126.50 S	210.99 W	134.90	10.23
6721.00	64.25	181.41	6563.46	169.06 S	211.64 W	177.45	7.65
6768.00	68.79	181.40	6582.18	212.14 S	212.70 W	220.54	9.65
6816.00	72.05	182.24	6598.27	257.34 S	214.14 W	265.76	7.00
6863.00	76.09	181.35	6611.16	302.50 S	215.55 W	310.94	8.79
6892.00	79.00	181.03	6617.41	330.81 S	216.14 W	339.25	10.07
6950.00	85.45	179.74	6625.26	388.24 S	216.52 W	396.65	11.34

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 182.31 DEGREES (GRID)
A TOTAL CORRECTION OF 7.58 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6950.00 FEET
IS 444.54 FEET ALONG 209.15 DEGREES (GRID)**

Surface surveys at 283' and 652' have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection to the bit from to 6892' to 6950'.