

**PCGC: Pressure Case Gamma**  
**PCDC: Pressure Case Directional**

[illegible]

## WELL INFORMATION

<b>MWD Run Number</b>	100	200			
<b>Date run completed</b>	26-Dec-13	27-Dec-13			
<b>Rig Bit Number</b>	2	3			
<b>Bit Size (in)</b>	8.750	8.750			
<b>Tool Nominal OD (in)</b>	6.750	6.750			
<b>Log Start Depth (TVD, ft)</b>	624.98	5,884.68			
<b>Log End Depth (TVD, ft)</b>	5,884.68	6,581.38			
<b>Drill or Wipe</b>	Drill	Drill			
<b>Drill/Wipe Start Date and Time</b>	25-Dec-13 02:15	26-Dec-13 18:30			
<b>Drill/Wipe End Date and Time</b>	26-Dec-13 05:00	27-Dec-13 08:15			
<b>Min Inc (deg) @ Depth (TVD, ft)</b>	0.22 @ 2,404.86	14.85 @ 5,869.22			
<b>Max Inc (deg) @ Depth (TVD, ft)</b>	17.03 @ 3,711.57	81.45 @ 6,576.01			
<b>Bit TFA(in2) / Bit Type</b>	0.75 / PDC	0.94 / PDC			
<b>Flow Rate (gpm)</b>	584.34	559.53			
<b>Max AV (fpm) / CV (fpm) @ MWD</b>	N/A / N/A	N/A / N/A			
<b>Fluid Type</b>	Polymer	Polymer			
<b>Density (ppg) / Viscosity (spqt)</b>	9.10 / 34.00	10.80 / 38.00			
<b>Filtrate CL (ppm)</b>	1,100.00	1,100.00			
<b>pH / Fluid Loss (mptm)</b>	8.30 / 10	8.60 / 8			
<b>PV (cP) / YP (lbf2)</b>	9 / 11.00	16 / 14.00			
<b>% Solids / % Sand</b>	7.2 / 0.75	13 / 0.4			
<b>% Oil / Oil:Water Ratio</b>	N/A / N/A	N/A / N/A			
<b>Rm @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A			
<b>Rmf @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A			
<b>Rmc @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A			
<b>Max Tool Temp (deg F) @ C</b>	151.00 / 304	125.50 / 258			

Max Tool Temp (degF) / Source	154.30 / PCM	165.58 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Henry Schmeidler	Henry Schmeidler			
Customer Representative	Martin Suarez	Martin Suarez			

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.84	5.84			
Sub Serial Number	11404263	11404263			
Insert Serial Number	11400878	11400878			
Date and Time Initialized	24-Dec-13 06:12	24-Dec-13 06:12			
Date and Time Read	27-Dec-13 17:52	27-Dec-13 17:06			
ECMB SW Version	N/A	N/A			

### Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	54.84	52.22			
Software Version	6.21	6.21			
Sub Serial Number	11404263	11404263			
Sonde Serial Number	11833264	11833264			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	5.35	93.73			

### Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.84	47.22			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404263	11404263			
Insert/Sonde Serial Number	11680921	11680921			

## 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 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 8.0.0

## WARRANTY

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Sperry Drilling Services

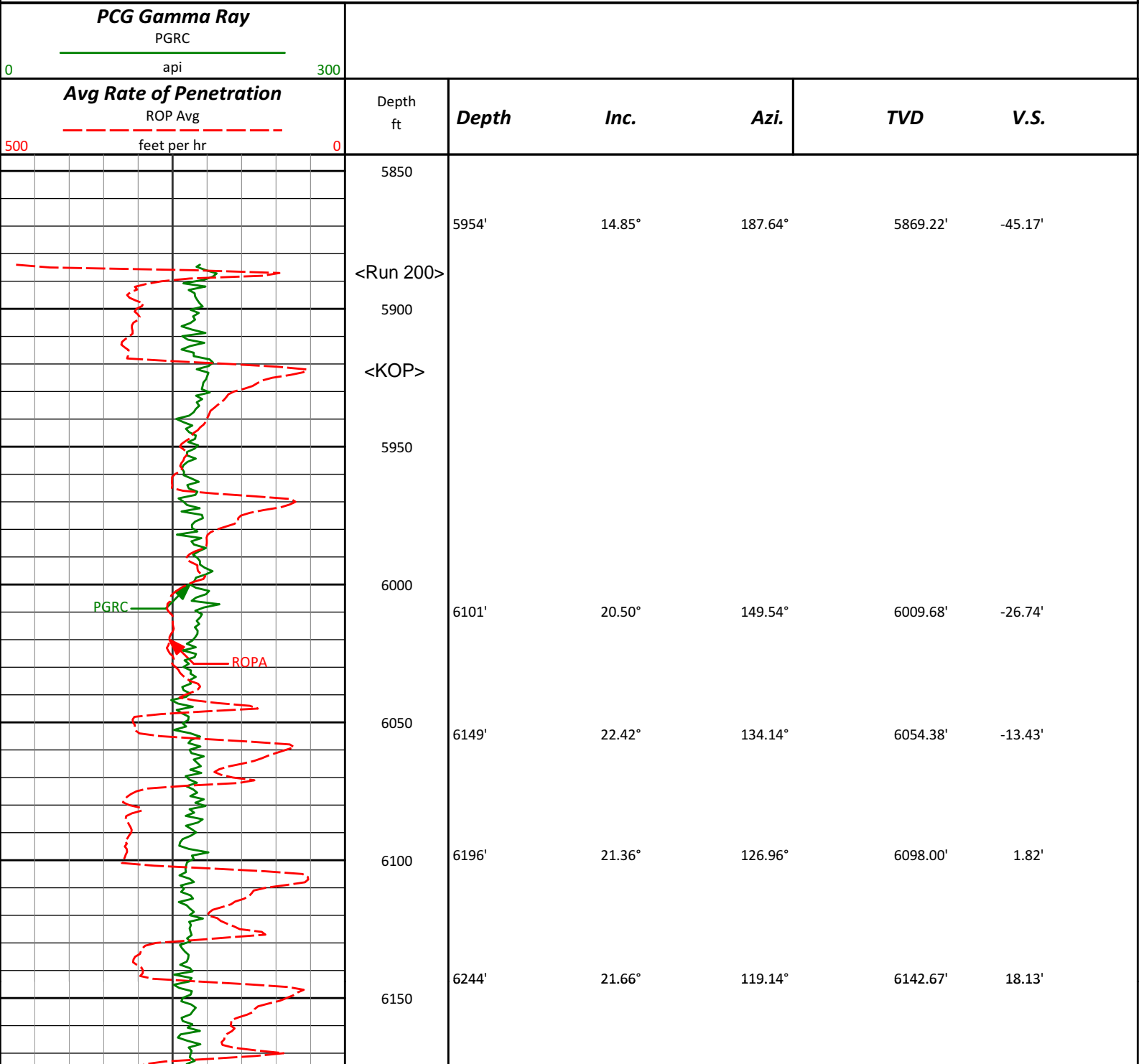
TVD Detail Log 1:600

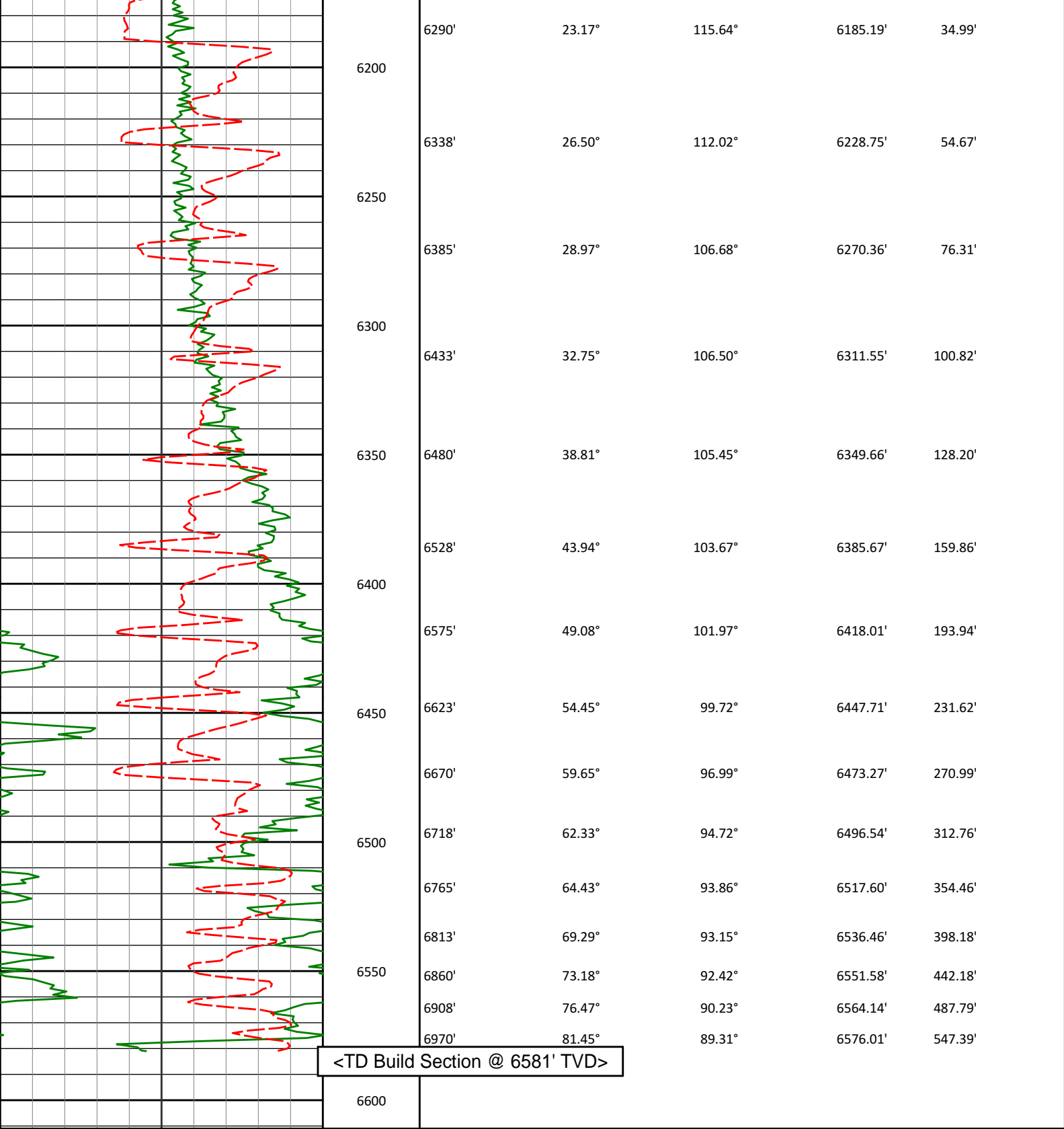
Noble Energy, Inc

Seyler B10-62-1HN

H&P 315

T5N R64W

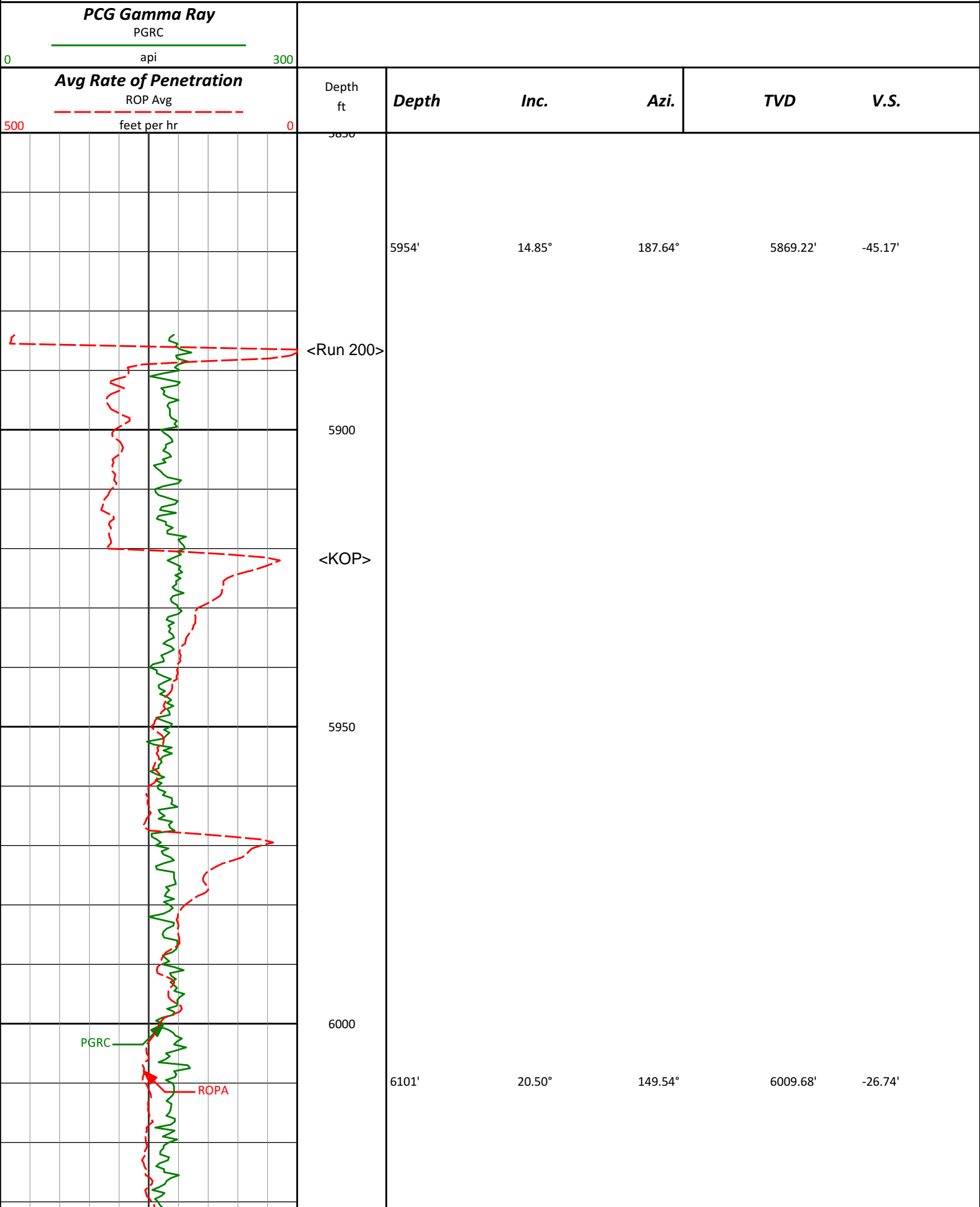


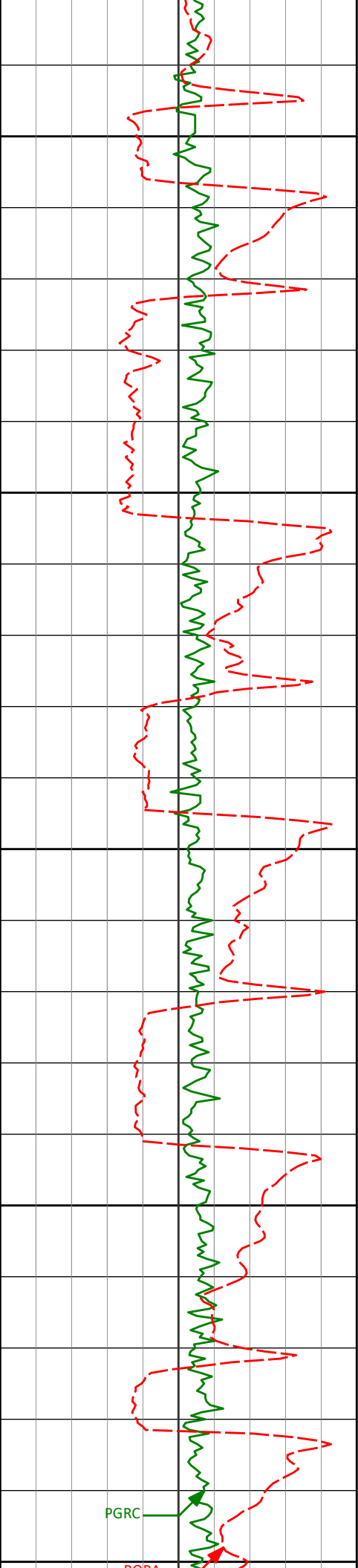


Avg Rate of Penetration		Depth ft				TVD	V.S.
ROP Avg	feet per hr		Depth	Inc.	Azi.		
500	0						
PCG Gamma Ray							
PGRC	api						
0	300						

**HALLIBURTON**  
**Sperry Drilling Services**

TVD Detail Log 1:240





6050

6149'

22.42°

134.14°

6054.38'

-13.43'

6100

6196'

21.36°

126.96°

6098.00'

1.82'

6150

6244'

21.66°

119.14°

6142.67'

18.13'

6290'

23.17°

115.64°

6185.19'

34.99'

6200

6338'

26.50°

112.02°

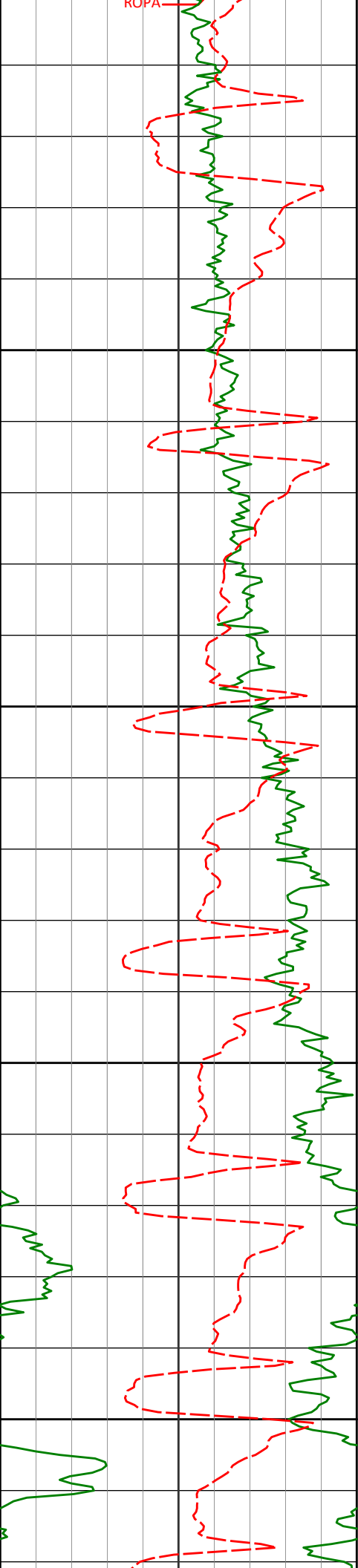
6228.75'

54.67'

6250

PGRC

DORA



6300

6400

6450

6385'	28.97°	106.68°	6270.36'	76.31'
6433'	32.75°	106.50°	6311.55'	100.82'
6480'	38.81°	105.45°	6349.66'	128.20'
6528'	43.94°	103.67°	6385.67'	159.86'
6575'	49.08°	101.97°	6418.01'	193.94'
6623'	54.45°	99.72°	6447.71'	231.62'





898.00	0.61	82.63	897.97	2.92 N	6.18 E	5.49	0.40
992.00	0.36	77.39	991.97	3.05 N	6.96 E	6.23	0.27
1085.00	0.39	108.38	1084.97	3.02 N	7.55 E	6.81	0.22
1178.00	0.23	32.09	1177.96	3.08 N	7.95 E	7.19	0.43
1269.00	0.52	76.33	1268.96	3.33 N	8.45 E	7.63	0.43
1362.00	0.46	56.40	1361.96	3.63 N	9.17 E	8.28	0.19
1456.00	0.59	15.56	1455.96	4.31 N	9.61 E	8.58	0.41
1551.00	0.29	23.84	1550.95	5.00 N	9.84 E	8.67	0.32
1646.00	0.54	11.92	1645.95	5.66 N	10.03 E	8.72	0.28
1741.00	0.75	16.47	1740.94	6.69 N	10.30 E	8.79	0.23
1836.00	1.05	14.44	1835.93	8.13 N	10.69 E	8.89	0.32
1931.00	1.05	308.88	1930.92	9.52 N	10.23 E	8.16	1.20
2025.00	1.20	311.67	2024.90	10.72 N	8.83 E	6.55	0.17
2120.00	0.83	277.69	2119.89	11.47 N	7.40 E	5.01	0.73
2215.00	1.15	180.89	2214.88	10.61 N	6.70 E	4.49	1.57
2310.00	0.86	165.73	2309.86	8.96 N	6.87 E	4.97	0.41
2405.00	0.22	8.50	2404.86	8.45 N	7.07 E	5.27	1.12
2499.00	0.46	240.65	2498.86	8.45 N	6.77 E	4.98	0.66
2594.00	0.62	252.43	2593.85	8.10 N	5.94 E	4.24	0.20
2689.00	2.18	215.38	2688.82	6.48 N	4.41 E	3.05	1.82
2784.00	3.85	206.54	2783.69	2.15 N	1.94 E	1.48	1.82
2879.00	5.11	191.47	2878.40	4.85 S	0.33 W	0.63	1.80
2973.00	6.23	195.59	2971.94	13.87 S	2.53 W	0.24	1.27
3068.00	7.39	199.67	3066.27	24.58 S	5.98 W	-1.03	1.32
3163.00	10.07	198.84	3160.16	38.20 S	10.72 W	-3.01	2.82
3258.00	11.62	196.42	3253.46	55.24 S	16.10 W	-4.95	1.70
3353.00	12.54	194.93	3346.36	74.38 S	21.46 W	-6.45	1.02
3448.00	14.25	198.53	3438.77	95.44 S	27.84 W	-8.56	2.00
3542.00	16.06	198.63	3529.50	118.73 S	35.67 W	-11.67	1.93
3637.00	16.68	198.31	3620.65	144.12 S	44.15 W	-15.00	0.66
3732.00	17.03	193.98	3711.57	170.57 S	51.79 W	-17.31	1.37
3827.00	16.69	191.98	3802.49	197.41 S	57.99 W	-18.11	0.71
3922.00	13.89	185.21	3894.12	222.12 S	61.85 W	-17.05	3.49
4017.00	12.79	191.01	3986.56	243.80 S	64.90 W	-15.78	1.82
4112.00	12.87	192.94	4079.19	264.43 S	69.28 W	-16.02	0.46
4207.00	13.02	199.44	4171.78	284.84 S	75.21 W	-17.83	1.54
4302.00	14.62	198.02	4264.03	306.33 S	82.48 W	-20.74	1.72
4397.00	12.70	195.76	4356.34	327.78 S	89.02 W	-22.95	2.10
4491.00	12.99	194.25	4447.98	347.97 S	94.43 W	-24.29	0.47
4586.00	13.78	195.42	4540.40	369.22 S	100.07 W	-25.65	0.88
4681.00	13.46	196.11	4632.73	390.75 S	106.14 W	-27.38	0.38
4776.00	13.47	198.22	4725.12	411.88 S	112.67 W	-29.63	0.52
4871.00	14.83	197.46	4817.24	433.99 S	119.78 W	-32.26	1.44
4966.00	15.30	195.13	4908.97	457.69 S	126.70 W	-34.39	0.81
5061.00	12.40	192.92	5001.20	479.74 S	132.25 W	-35.51	3.10
5155.00	12.65	194.01	5092.96	499.56 S	137.00 W	-36.28	0.37
5250.00	12.47	195.97	5185.69	519.51 S	142.34 W	-37.60	0.49
5345.00	12.36	193.80	5278.47	539.25 S	147.59 W	-38.87	0.50
5440.00	13.16	196.29	5371.12	559.50 S	153.05 W	-40.25	1.02
5535.00	14.11	197.68	5463.44	580.92 S	159.60 W	-42.46	1.06
5630.00	13.75	198.48	5555.65	602.66 S	166.69 W	-45.15	0.43
5725.00	14.34	191.04	5647.82	624.91 S	172.52 W	-46.50	2.00
5820.00	14.71	190.13	5739.78	648.33 S	176.90 W	-46.20	0.46
5913.00	15.22	189.88	5829.63	671.98 S	181.07 W	-45.64	0.55
5954.00	14.85	187.64	5869.22	682.49 S	182.69 W	-45.17	1.68
6101.00	20.50	149.54	6009.68	723.52 S	172.10 W	-26.74	8.55
6149.00	22.42	134.14	6054.38	737.15 S	161.27 W	-13.43	12.36
6196.00	21.36	126.96	6098.00	748.54 S	147.99 W	1.82	6.12
6244.00	21.66	119.14	6142.67	758.11 S	133.27 W	18.13	6.00
6290.00	23.17	115.64	6185.19	766.16 S	117.69 W	34.99	4.38
6338.00	26.50	112.02	6228.75	774.26 S	99.24 W	54.67	7.62
6385.00	28.97	106.68	6270.36	781.47 S	78.61 W	76.31	7.45
6433.00	32.75	106.50	6311.55	788.49 S	55.02 W	100.82	7.88
6480.00	38.81	105.45	6349.66	796.03 S	28.61 W	128.20	12.96
6528.00	43.94	103.67	6385.67	803.98 S	2.09 E	159.86	10.96
6575.00	49.08	101.97	6418.01	811.52 S	35.33 E	193.94	11.25
6623.00	54.45	99.72	6447.71	818.59 S	72.35 E	231.62	11.78
6670.00	59.65	96.99	6473.27	824.29 S	111.35 E	270.99	12.09
6718.00	62.33	94.72	6496.54	828.56 S	153.11 E	312.76	6.95
6765.00	64.43	93.86	6517.60	831.70 S	195.00 E	354.46	4.76
6813.00	69.88	93.15	6536.46	834.39 S	232.05 E	398.18	12.88

6813.00	69.29	93.15	6536.46	834.39 S	239.05 E	396.18	10.22
6860.00	73.18	92.42	6551.58	836.55 S	283.49 E	442.18	8.41
6908.00	76.47	90.23	6564.14	837.61 S	329.79 E	487.79	8.15
6970.00	81.45	89.31	6576.01	837.37 S	390.62 E	547.39	8.16
7024.00	87.13	90.00	6581.38	837.04 S	444.33 E	599.99	10.60

# 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 101.32 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.82 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 7024.00 FEET  
IS 947.67 FEET ALONG 152.04 DEGREES (GRID)

Surface surveys at 304 ft and 585 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 6970 ft MD to TD at 7042 ft MD.

Date Printed:29 December 2013