

PCGC: Pressure Case Gamma
PCDC: Pressure Case Directional

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	26-Aug-13	27-Aug-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)	647.00	5,951.01			
Log End Depth (TVD, ft)	5,951.01	6,597.88			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	25-Aug-13 21:30	26-Aug-13 22:30			
Drill/Wipe End Date and Time	26-Aug-13 12:30	27-Aug-13 12:30			
Min Inc (deg) @ Depth (TVD, ft)	.22 @ 5,138.04	.87 @ 5,916.02			
Max Inc (deg) @ Depth (TVD, ft)	13.86 @ 2,678.41	82.49 @ 6,592.99			
Bit TFA(in2) / Bit Type	.77 / PDC	.75 / PDC			
Flow Rate (gpm)	596.04	595.42			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Native/Spud Mud			
Density (ppg) / Viscosity (spqt)	8.90 / 29.00	10.15 / 38.00			
Filtrate CL (ppm)	1,600.00	1,600.00			
pH / Fluid Loss (mptm)	10.80 / 10	9.10 / 0			
PV (cP) / YP (lbf2)	5 / 5.00	10 / 9.00			
% Solids / % Sand	4.1 / 0.25	9.90 / 0.25			
% 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 (deg F) @ 100 ft	122.00 / 120M	125.00 / 120M			

Max Tool Temp (degF) / Source	162.80 / PCM	185.02 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Henry Schmeidler	Henry Schmeidler			
Customer Representative	Bryant Dear	Bryant Dear			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.84	5.84			
Sub Serial Number	11254959	11254959			
Insert Serial Number	11619996	11619996			
Date and Time Initialized	25-Aug-13 15:05	25-Aug-13 15:05			
Date and Time Read	27-Aug-13 17:57	27-Aug-13 18:02			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	54.11	52.27			
Software Version	6.21	6.21			
Sub Serial Number	11254959	11254959			
Sonde Serial Number	11145701	11145701			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	336.00	48.39			

Gamma Ray Sensor Information

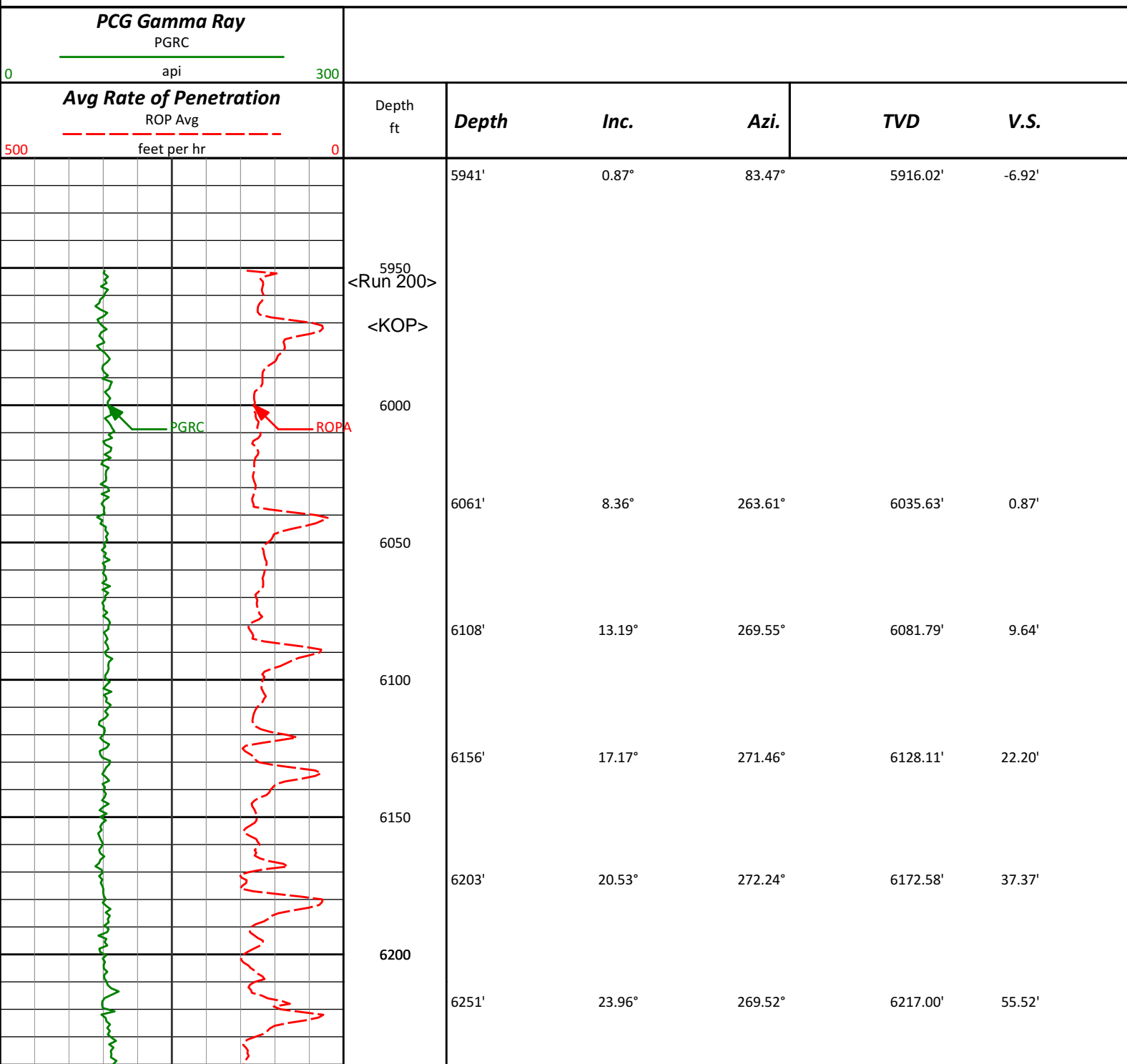
Tool Type	PCG	PCG			
Distance From Bit (ft)	49.11	47.27			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11254959	11254959			
Insert/Sonde Serial Number	12035849	12035849			

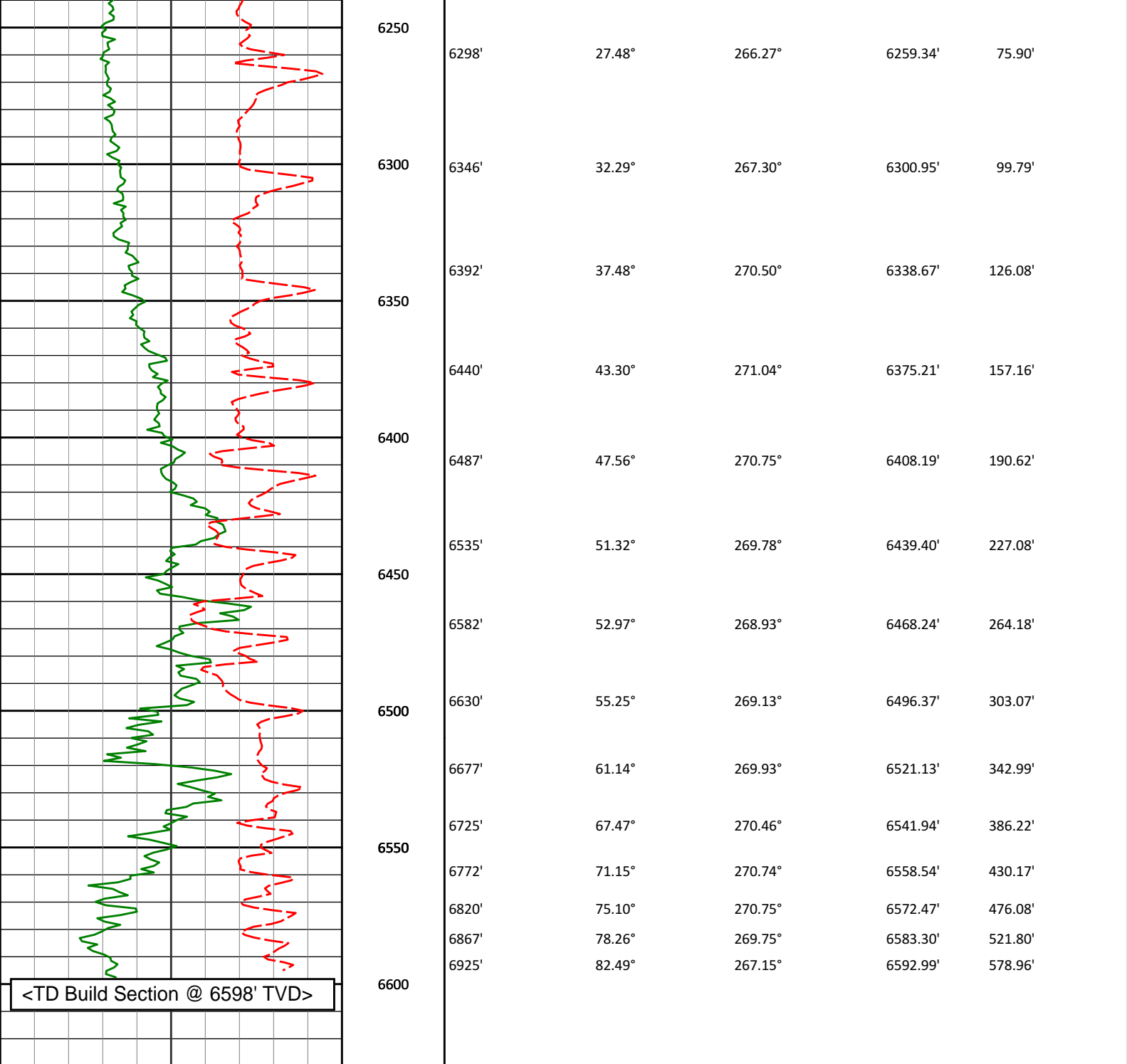
REMARKS

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 7.4.20

WARRANTY

HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING.





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

HALLIBURTON Sperry Drilling Services TVD Detail Log 1:240

Noble Energy, Inc
 Holman B15-66HN
 H&P 315
 T5N R64W

PLG Gamma Ray

PGRC

api

300

Avg Rate of Penetration

ROP Avg

feet per hr

Depth
ft

Depth

Inc.

Azi.

TVD

V.S.

5941'

0.87°

83.47°

5916.02'

-6.92'

5950
<Run 200>

<KOP>

6000

6061'

 8.36°

263.61°

6035.63'

0.87'

6050

6108'

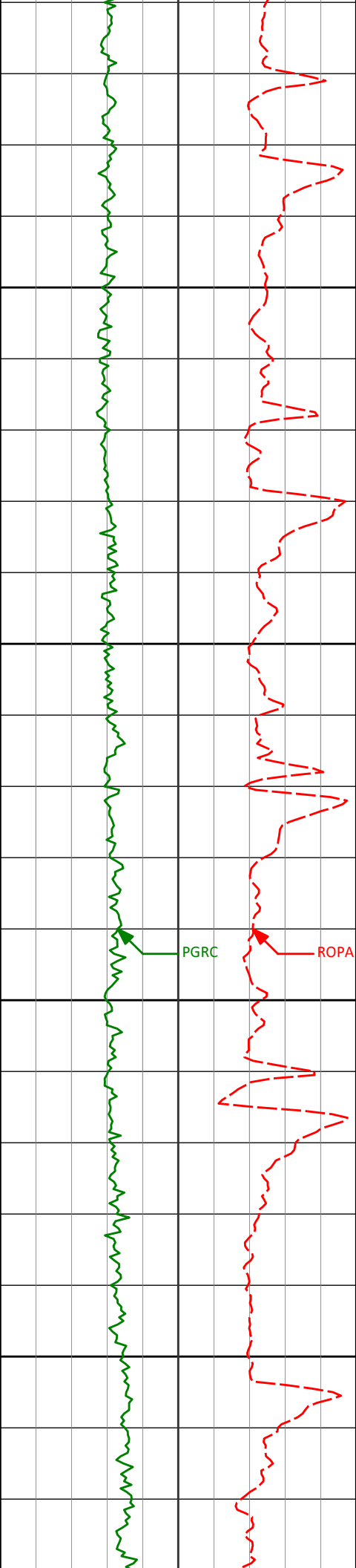
13.19°

269.55°

6081.79'

9.64'

6100



6150

6200

6250

6300

6156'

17.17°

271.46°

6128.11'

22.20'

6203'

20.53°

272.24°

6172.58'

37.37'

6251'

23.96°

269.52°

6217.00'

55.52'

6298'

27.48°

266.27°

6259.34'

75.90'

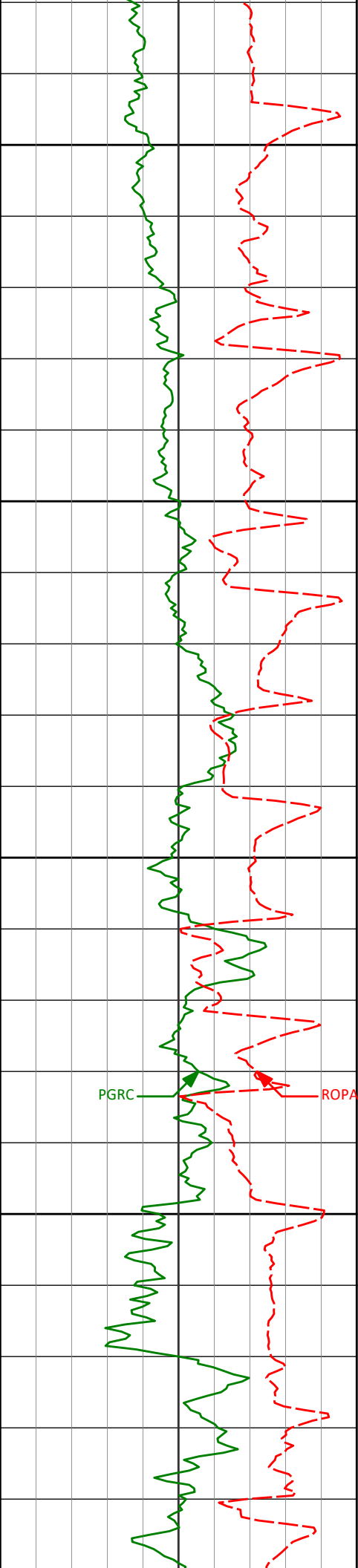
6346'

32.29°

267.30°

6300.95'

99.79'



6350

6392'

37.48°

270.50°

6338.67'

126.08'

6440'

43.30°

271.04°

6375.21'

157.16'

6400

6487'

47.56°

270.75°

6408.19'

190.62'

6450

6535'

51.32°

269.78°

6439.40'

227.08'

6582'

52.97°

268.93°

6468.24'

264.18'

6500

6630'

55.25°

269.13°

6496.37'

303.07'

6677'

61.14°

269.93°

6521.13'

342.99'

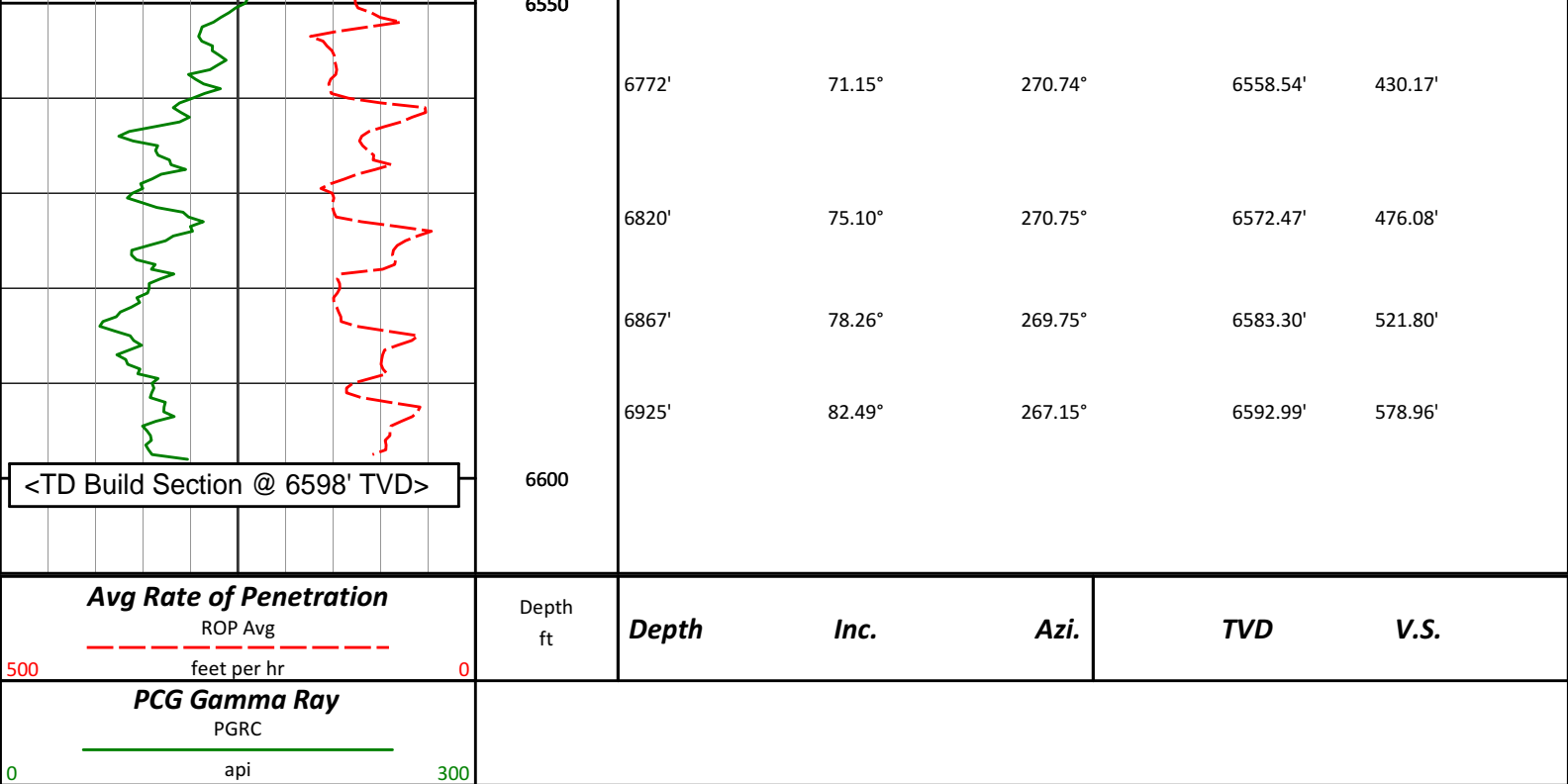
6725'

67.47°

270.46°

6541.94'

386.22'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Holman B15-66HN
Wattenberg
Weld Colorado
USA
CA-XX-0900671436

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
330.00	0.30	29.23	330.00	0.75 N	0.42 E	-0.43	0.09
615.00	0.30	276.53	615.00	1.49 N	0.04 E	-0.06	0.18
716.00	0.36	299.67	715.99	1.68 N	0.49 W	0.47	0.14
808.00	0.64	17.82	807.99	2.31 N	0.59 W	0.56	0.72
900.00	0.50	351.30	899.99	3.20 N	0.49 W	0.45	0.32
994.00	0.61	354.55	993.98	4.10 N	0.60 W	0.55	0.12
1087.00	0.53	49.19	1086.98	4.87 N	0.32 W	0.27	0.57
1179.00	0.69	350.06	1178.97	5.70 N	0.10 W	0.03	0.67
1273.00	0.47	43.37	1272.97	6.53 N	0.07 E	-0.15	0.59
1366.00	0.55	31.79	1365.97	7.19 N	0.57 E	-0.65	0.14
1460.00	0.42	9.73	1459.96	7.91 N	0.86 E	-0.96	0.24
1555.00	1.64	27.69	1554.95	9.46 N	1.56 E	-1.66	1.31
1650.00	3.40	23.10	1649.85	13.26 N	3.29 E	-3.44	1.86
1745.00	4.14	7.19	1744.65	19.25 N	4.83 E	-5.05	1.34
1840.00	6.05	357.57	1839.27	27.65 N	5.04 E	-5.36	2.20
1935.00	7.12	353.50	1933.64	38.51 N	4.16 E	-4.61	1.23
2030.00	9.10	356.82	2027.69	51.86 N	3.08 E	-3.68	2.14
2125.00	10.12	352.96	2121.35	67.64 N	1.64 E	-2.42	1.27
2219.00	9.89	356.17	2213.93	83.89 N	0.09 E	-1.06	0.64
2314.00	11.96	1.44	2307.20	101.88 N	0.21 W	-0.97	2.42
2409.00	10.77	358.39	2400.34	120.59 N	0.21 W	-1.18	1.40
2504.00	11.83	2.29	2493.50	139.19 N	0.07 W	-1.53	1.37
2599.00	13.71	6.66	2586.14	160.11 N	1.63 E	-3.47	2.22
2694.00	13.86	6.17	2678.41	182.60 N	4.15 E	-6.26	0.20
2789.00	12.23	4.04	2770.95	203.96 N	6.09 E	-8.44	1.79
2884.00	11.48	1.84	2863.93	223.44 N	7.10 E	-9.67	0.92

2979.00	9.65	358.78	2957.31	240.85 N	7.23 E	-10.01	2.01
3074.00	8.52	358.41	3051.12	255.85 N	6.87 E	-9.81	1.19
3169.00	6.33	0.53	3145.32	268.12 N	6.72 E	-9.81	2.32
3264.00	4.79	358.84	3239.87	277.32 N	6.69 E	-9.88	1.63
3359.00	3.89	357.41	3334.59	284.51 N	6.46 E	-9.74	0.95
3454.00	3.69	357.59	3429.39	290.78 N	6.19 E	-9.54	0.21
3549.00	2.51	13.08	3524.25	295.86 N	6.53 E	-9.94	1.51
3644.00	1.50	346.40	3619.19	299.10 N	6.71 E	-10.15	1.42
3739.00	0.94	19.08	3714.17	301.04 N	6.67 E	-10.14	0.92
4023.00	0.44	294.28	3998.15	303.69 N	6.44 E	-9.94	0.35
4308.00	1.54	271.33	4283.11	304.23 N	1.61 E	-5.12	0.40
4593.00	0.37	147.66	4568.08	303.54 N	1.72 W	-1.77	0.62
4878.00	0.97	161.16	4853.05	300.48 N	0.45 W	-3.01	0.22
5163.00	0.22	14.95	5138.04	298.73 N	0.47 E	-3.91	0.41
5447.00	0.82	141.93	5422.03	297.66 N	1.86 E	-5.29	0.34
5732.00	0.62	327.58	5707.03	297.35 N	2.29 E	-5.72	0.50
5920.00	0.93	110.59	5895.02	297.67 N	3.18 E	-6.60	0.78
5941.00	0.87	83.47	5916.02	297.63 N	3.49 E	-6.92	2.03
6061.00	8.36	263.61	6035.63	296.76 N	4.29 W	0.87	7.69
6108.00	13.19	269.55	6081.79	296.34 N	13.05 W	9.64	10.53
6156.00	17.17	271.46	6128.11	296.48 N	25.61 W	22.20	8.36
6203.00	20.53	272.24	6172.58	296.98 N	40.79 W	37.37	7.17
6251.00	23.96	269.52	6217.00	297.22 N	58.95 W	55.52	7.46
6298.00	27.48	266.27	6259.34	296.44 N	79.32 W	75.90	8.07
6346.00	32.29	267.30	6300.95	295.11 N	103.19 W	99.79	10.08
6392.00	37.48	270.50	6338.67	294.66 N	129.48 W	126.08	11.96
6440.00	43.30	271.04	6375.21	295.08 N	160.57 W	157.16	12.15
6487.00	47.56	270.75	6408.19	295.60 N	194.04 W	190.62	9.07
6535.00	51.32	269.78	6439.40	295.76 N	230.50 W	227.08	7.98
6582.00	52.97	268.93	6468.24	295.34 N	267.60 W	264.18	3.79
6630.00	55.25	269.13	6496.37	294.68 N	306.48 W	303.07	4.76
6677.00	61.14	269.93	6521.13	294.37 N	346.41 W	342.99	12.61
6725.00	67.47	270.46	6541.94	294.52 N	389.64 W	386.22	13.22
6772.00	71.15	270.74	6558.54	294.98 N	433.60 W	430.17	7.85
6820.00	75.10	270.75	6572.47	295.58 N	479.52 W	476.08	8.23
6867.00	78.26	269.75	6583.30	295.77 N	525.25 W	521.80	7.03
6925.00	82.49	267.15	6592.99	294.22 N	582.39 W	578.96	8.53
6979.00	87.12	266.00	6597.88	291.01 N	636.06 W	632.66	8.83

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 269.34 DEGREES (GRID)
A TOTAL CORRECTION OF 7.83 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6979.00 FEET
IS 699.47 FEET ALONG 294.58 DEGREES (GRID)**

Surface surveys at 330 ft and 615 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last Survey is projection from 6925 ft MD to TD at 6979 ft MD.