

PCGK: Pressure Case Gamma
PCDC: Pressure Case Directional



1 : 600 / 1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	03-Nov-12	05-Nov-12			
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)	637.00	5,863.32			
Log End Depth (TVD, ft)	5,863.32	6,641.16			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	02-Nov-12 14:20	03-Nov-12 14:00			
Drill/Wipe End Date and Time	03-Nov-12 04:15	04-Nov-12 10:30			
Min Inc (deg) @ Depth (TVD, ft)	0 @ 627.00	.68 @ 5,869.31			
Max Inc (deg) @ Depth (TVD, ft)	7.87 @ 2,597.30	88.89 @ 6,641.16			
Bit TFA(in2) / Bit Type	.75 / PDC	.75 / Diamond			
Flow Rate (gpm)	591.00	559.00			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Fresh Water Gel	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	8.85 / 33.00	10.60 / 38.00			
Filtrate CL (ppm)	1,400.00	1,400.00			
pH / Fluid Loss (mptm)	9.10 / 10	9.10 / 9			
PV (cP) / YP (lbf2)	10 / 6.00	11 / 11.00			
% Solids / % Sand	3.00 / 0.25	11.3 / 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	144.53 @ 100 ft	170.87 @ 100 ft			

Max Tool Temp (degF) / Source	141.70 / PCM	170.37 / 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	5.76	5.76			
Sub Serial Number	246130	246130			
Insert Serial Number	11680744	11680744			
Date and Time Initialized	02-Nov-12 06:28	02-Nov-12 06:28			
Date and Time Read	04-Nov-12 18:11	04-Nov-12 18:02			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	54.99	54.99			
Software Version	6.21	6.21			
Sub Serial Number	246130	246130			
Sonde Serial Number	11478107	11478107			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	129.49	304.90			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	50.19	50.19			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	246130	246130			
Insert/Sonde Serial Number	11680968	11680968			

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 7.3.5

WARRANTY

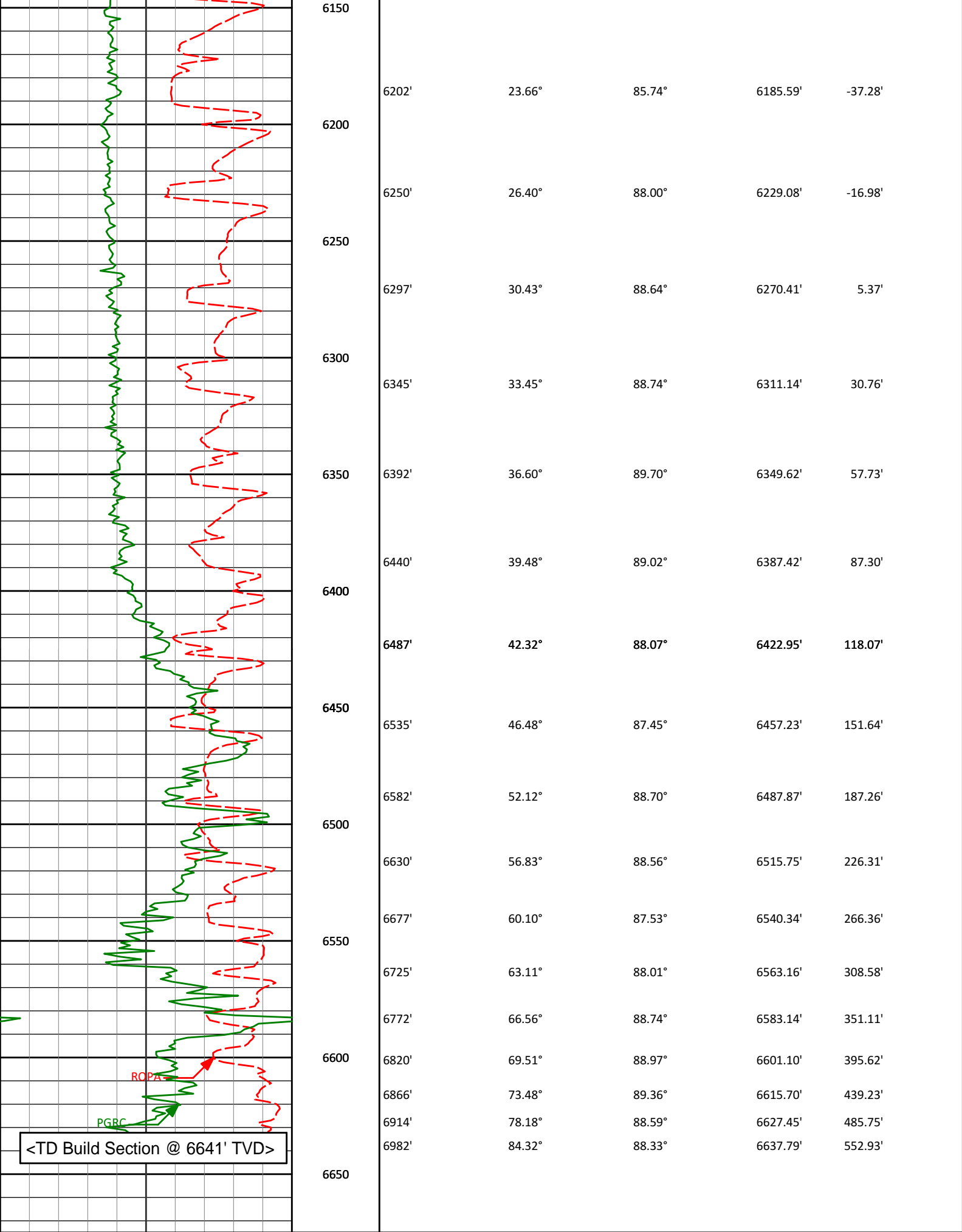
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HALLIBURTON
Sperry Drilling Services
TVD Main Log 1:600

Noble Energy, Inc
Wells Ranch AE18-68-1HN
H&P 315
T6N R62W

PCG Gamma Ray PGRC						
0	300					
Avg Rate of Penetration ROPA		Depth ft	Depth	Inc.	Azi.	TVD V.S.
500	0					
		5850				
		<Run 200>	5876'	0.68°	134.02°	5869.31' -104.46'
		5900				
		<KOP>				
		5950				
			5965'	5.37°	103.60°	5958.17' -100.07'
		6000				
PGRC	ROPA		6012'	9.88°	92.25°	6004.74' -93.92'
		6050				
			6060'	13.97°	89.35°	6051.70' -84.01'
		6100				
			6107'	17.69°	88.09°	6096.91' -71.19'
			6155'	21.24°	85.35°	6142.16' -55.21'



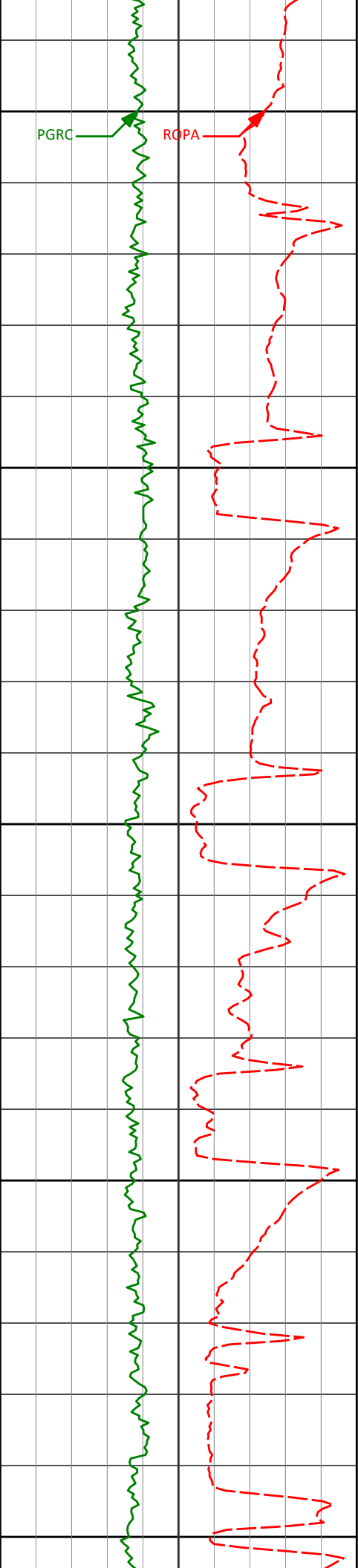
Avg Rate of Penetration		Depth	Inc.	Azi.	TVD	V.S.
----- ROPA		ft				

500	feet per hr	0	
PCG Gamma Ray PGRC			
0	api	300	

HALLIBURTON
Sperry Drilling Services
TVD Detail Log 1:240

Noble Energy, Inc
Wells Ranch AE18-68-1HN
H&P 315
T6N R62W

<div>PCG Gamma Ray</div> <div>PGRC</div> <div>0300</div> <div>api</div>							
<div>Avg Rate of Penetration</div> <div>ROPA</div> <div>5000</div> <div>feet per hr</div>		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
		5850					
		<Run 200>					
		5876'	5876'	0.68°	134.02°	5869.31'	-104.46'
		5900					
		<KOP>					
		5950					
		5965'	5965'	5.37°	103.60°	5958.17'	-100.07'



6000

6012'	9.88°	92.25°	6004.74'	-93.92'
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6050

6060'	13.97°	89.35°	6051.70'	-84.01'
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6100

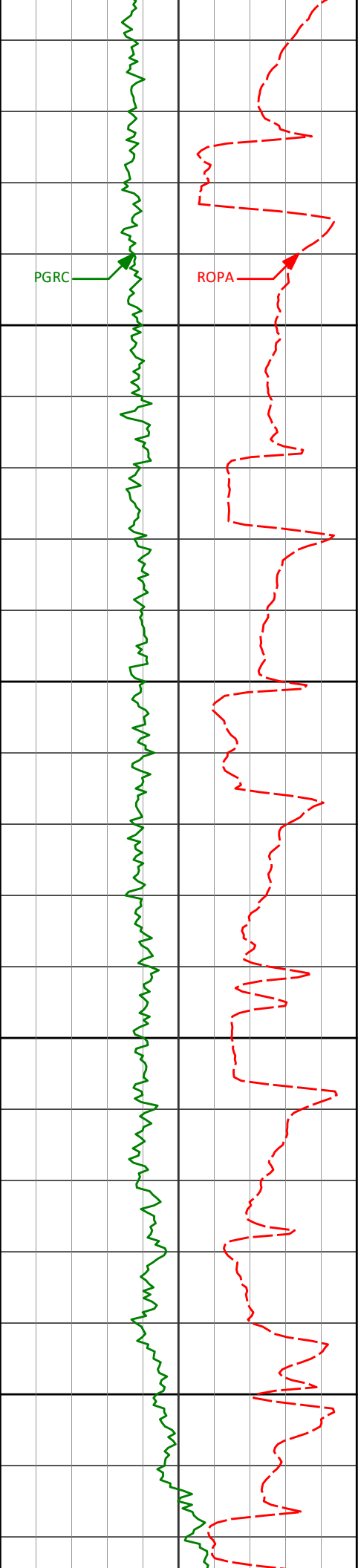
6107'	17.69°	88.09°	6096.91'	-71.19'
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6150

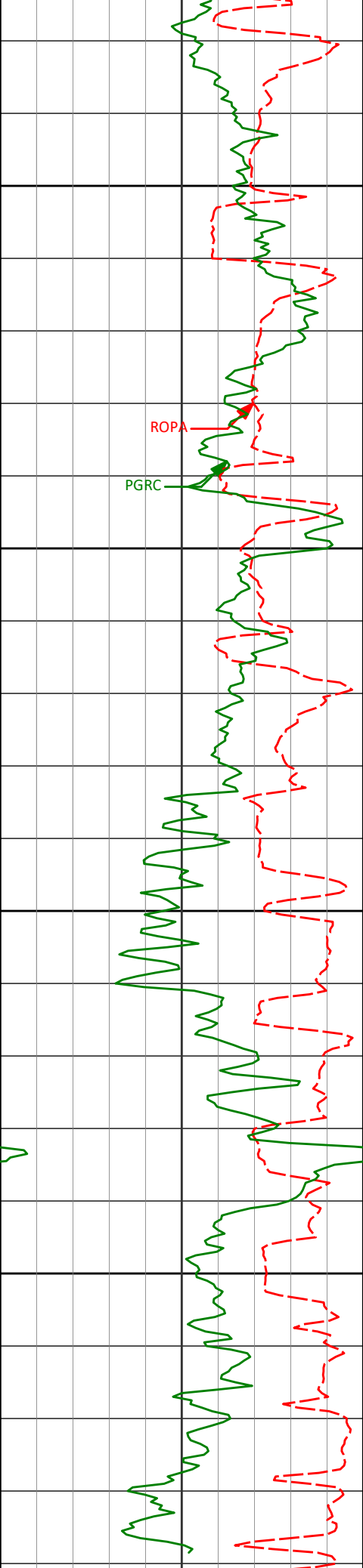
6155'	21.24°	85.35°	6142.16'	-55.21'
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6200

6202'	23.66°	85.74°	6185.59'	-37.28'
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6250	6250'	26.40°	88.00°	6229.08'	-16.98'
	6297'	30.43°	88.64°	6270.41'	5.37'
6300	6345'	33.45°	88.74°	6311.14'	30.76'
	6392'	36.60°	89.70°	6349.62'	57.73'
6350	6440'	39.48°	89.02°	6387.42'	87.30'
	6487'	42.32°	88.07°	6422.95'	118.07'



6450

6535'

46.48°

87.45°

6457.23'

151.64'

6582'

52.12°

88.70°

6487.87'

187.26'

6500

6630'

56.83°

88.56°

6515.75'

226.31'

6677'

60.10°

87.53°

6540.34'

266.36'

6550

6725'

63.11°

88.01°

6563.16'

308.58'

6772'

66.56°

88.74°

6583.14'

351.11'

6600

6820'

69.51°

88.97°

6601.10'

395.62'

6866'

73.48°

89.36°

6615.70'

439.23'

6914'

78.18°

88.59°

6627.45'

485.75'

6982'

84.32°

88.33°

6637.79'

552.93'

TVD Data Section - 001 - 172																				CSE									
Avg Rate of Penetration										Depth										Depth <i>Inc.</i> <i>Azi.</i> <i>TVD</i> <i>V.S.</i>									
ROPA										ft																			
500 feet per hr 0																													
PCG Gamma Ray																													
PGRC																													
0 api 300																													



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
 Wells Ranch AE18-68-1HN
 Wattenberg
 Weld Colorado
 USA
 CA-XX-0009901119

Survey depth 627 ft created to tie surveys onto bottom of the surface casing shoe.

Last survey is a projection to the bit at TD.

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
627.00	0.00	0.00	627.00	0.00 N	0.00 E	0.00	TIE-IN
718.00	0.13	76.08	718.00	0.02 N	0.10 E	0.10	0.14
997.00	0.38	184.80	997.00	0.81 S	0.32 E	0.30	0.16
1275.00	0.36	249.93	1274.99	2.02 S	0.57 W	-0.63	0.14
1557.00	0.91	180.92	1556.98	4.57 S	1.44 W	-1.57	0.30
1841.00	1.37	319.16	1840.95	4.27 S	3.69 W	-3.81	0.75
2031.00	2.93	303.93	2030.81	0.15 N	9.20 W	-9.19	0.87
2126.00	5.15	291.69	2125.57	3.08 N	15.18 W	-15.08	2.50
2221.00	3.47	280.94	2220.30	5.21 N	21.97 W	-21.81	1.96
2316.00	5.31	284.01	2315.02	6.82 N	29.05 W	-28.85	1.95
2411.00	5.49	296.76	2409.60	9.93 N	37.38 W	-37.08	1.27
2505.00	6.71	295.20	2503.07	14.29 N	46.35 W	-45.93	1.31
2600.00	7.87	291.14	2597.30	18.99 N	57.44 W	-56.87	1.33
2695.00	7.85	290.63	2691.41	23.62 N	69.57 W	-68.87	0.07
2790.00	7.85	287.45	2785.52	27.85 N	81.83 W	-81.01	0.46
2885.00	6.29	291.61	2879.79	31.72 N	92.86 W	-91.92	1.74
2980.00	5.62	298.57	2974.28	35.86 N	101.78 W	-100.72	1.04
3075.00	4.34	278.84	3068.93	38.63 N	109.41 W	-108.27	2.23
3169.00	1.86	268.64	3162.79	39.14 N	114.45 W	-113.29	2.69
3264.00	1.03	239.89	3257.76	38.68 N	116.73 W	-115.58	1.14
3549.00	1.87	167.09	3542.68	32.86 N	117.90 W	-116.92	0.65
3834.00	1.70	160.61	3827.54	24.33 N	115.46 W	-114.72	0.09
4118.00	1.46	95.98	4111.46	19.99 N	110.46 W	-109.85	0.60
4403.00	1.02	41.16	4396.40	21.52 N	105.17 W	-104.52	0.42
4688.00	1.03	20.30	4681.35	25.85 N	102.61 W	-101.83	0.13
4973.00	0.48	275.34	4966.34	28.37 N	102.91 W	-102.06	0.44
5258.00	0.42	266.18	5251.33	28.41 N	105.14 W	-104.29	0.03
5542.00	0.47	354.88	5535.32	29.50 N	106.28 W	-105.40	0.22
5813.00	0.38	135.87	5806.32	29.95 N	105.75 W	-104.86	0.29
5876.00	0.68	134.02	5869.31	29.54 N	105.34 W	-104.46	0.48
5965.00	5.37	103.60	5958.17	28.19 N	100.91 W	-100.07	5.38
6012.00	9.88	92.25	6004.74	27.51 N	94.74 W	-93.92	10.08
6060.00	13.97	89.35	6051.70	27.42 N	84.82 W	-84.01	8.62
6107.00	17.69	88.09	6096.91	27.72 N	72.01 W	-71.19	7.95
6155.00	21.24	85.35	6142.16	28.67 N	56.05 W	-55.21	7.62
6202.00	23.66	85.74	6185.59	30.06 N	38.15 W	-37.28	5.18
6250.00	26.40	88.00	6229.08	31.15 N	17.88 W	-16.98	6.03
6297.00	30.43	88.64	6270.41	31.79 N	4.47 E	5.37	8.59
6345.00	33.45	88.74	6311.14	32.37 N	29.85 E	30.76	6.31
6392.00	36.60	89.70	6349.62	32.73 N	56.82 E	57.73	6.79
6440.00	39.48	89.02	6387.42	33.07 N	86.40 E	87.30	6.06
6487.00	42.32	88.07	6422.95	33.86 N	117.15 E	118.07	6.18

6535.00	46.48	87.45	6457.23	35.18 N	150.70 E	151.64	8.73
6582.00	52.12	88.70	6487.87	36.36 N	186.30 E	187.26	12.16
6630.00	56.83	88.56	6515.75	37.29 N	225.34 E	226.31	9.81
6677.00	60.10	87.53	6540.34	38.66 N	265.37 E	266.36	7.20
6725.00	63.11	88.01	6563.16	40.30 N	307.56 E	308.58	6.33
6772.00	66.56	88.74	6583.14	41.50 N	350.07 E	351.11	7.49
6820.00	69.51	88.97	6601.10	42.39 N	394.57 E	395.62	6.14
6866.00	73.48	89.36	6615.70	43.03 N	438.18 E	439.23	8.67
6914.00	78.18	88.59	6627.45	43.86 N	484.70 E	485.75	9.92
6982.00	84.32	88.33	6637.79	45.66 N	551.85 E	552.93	9.04
7039.00	88.89	88.33	6641.16	47.32 N	608.71 E	609.81	8.02

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 CLOSURE OF 85.55 DEGREES (GRID)
 A TOTAL CORRECTION OF 7.80 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED
 HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
 HORIZONTAL DISPLACEMENT(CLOSURE) AT 7039.00 FEET
 IS 610.55 FEET ALONG 85.55 DEGREES (GRID)