



1:600 / 1:240

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	11-Aug-12	13-Aug-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)	657.00	5,697			
Log End Depth (TVD, ft)	5,697	6500.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	10-Aug-12 06:00	11-Aug-12 18:45			
Drill/Wipe End Date and Time	11-Aug-12 06:00	12-Aug-12 20:10			
Min Inc (deg) @ Depth (TVD, ft)	.15 @ 817.00	1.12 @ 5,742.88			
Max Inc (deg) @ Depth (TVD, ft)	16.37 @ 2,557.70	83.20 @ 6,495.68			
Bit TFA(in2) / Bit Type	.75 / PDC	.86 / PDC			
Flow Rate (gpm)	600.00	520.00			
Max AV (fpm) / CV (fpm) @ MWD	300.0 / 300.0	458.4 / 346.1			
Fluid Type	Fresh Water Gel	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	10.10 / 58.00	10.90 / 58.00			
Filtrate CL (ppm)	2,200.00	2,200.00			
pH / Fluid Loss (mptm)	9.60 / 99	9.60 / 28			
PV (cP) / YP (lbf2)	18 / 16.00	18 / 16.00			
% Solids / % Sand	10.00 / 0.75	10.00 / 0.75			
% 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) / S	458.45 / PDC	428.20 / PDC			

Max Tool Temp (degF) / Source	158.47 / PCM	163.20 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	adam sampson	adam sampson			
Customer Representative	mike pino	mike pino			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.76	5.76			
Sub Serial Number	11303519	11303519			
Insert Serial Number	11145604	11619972			
Date and Time Initialized	05-Aug-12 09:53	11-Aug-12 08:07			
Date and Time Read	11-Aug-12 13:39	13-Aug-12 01:10			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	57.00	50.00			
Software Version	6.21	6.21			
Sub Serial Number	11303519	11303519			
Sonde Serial Number	10993496	11478124			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	264.80	3.20			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.60	53.04			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11303519	11303519			
Insert/Sonde Serial Number	11293259	11121369			

REMARKS

1. All depths are calibrated to driller's pipe tally and are true vertical depth from the Drill Floor.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annular velocities are calculated using the "Power Law" model for water based fluids and the "Brigham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified.
5. The following smoothing parameters have been applied to the data:
PGRC (Gamma CG):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
Gap Fill: 3.0 ft

ROPA (Average Rate Of Penetration):
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft
6. Insite Version 7.3.5

WARRANTY

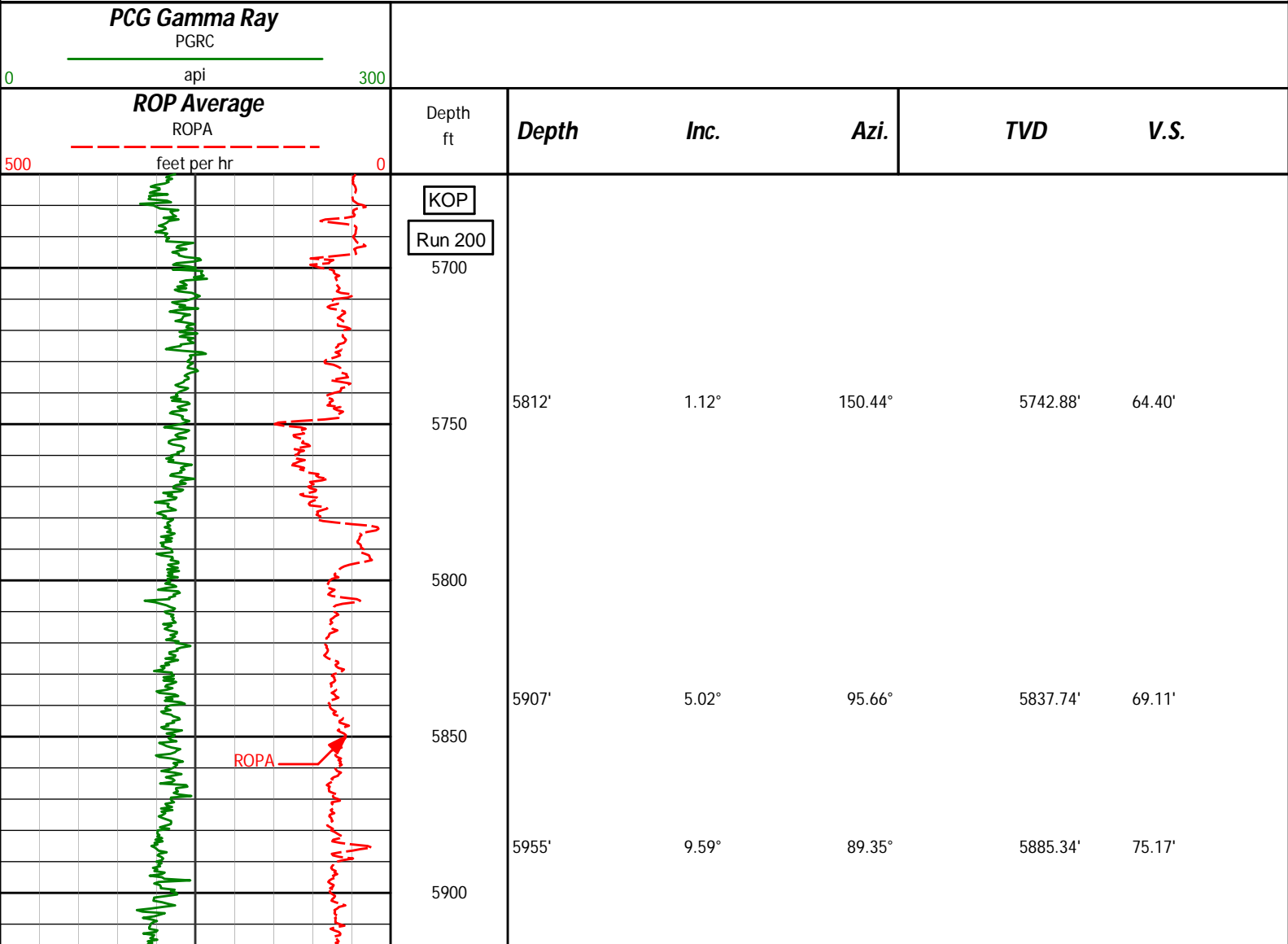
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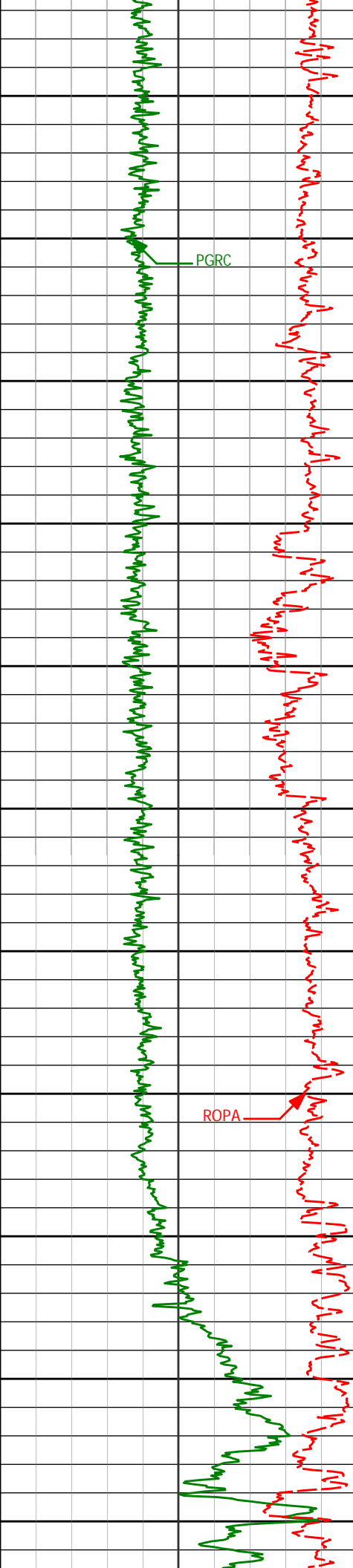
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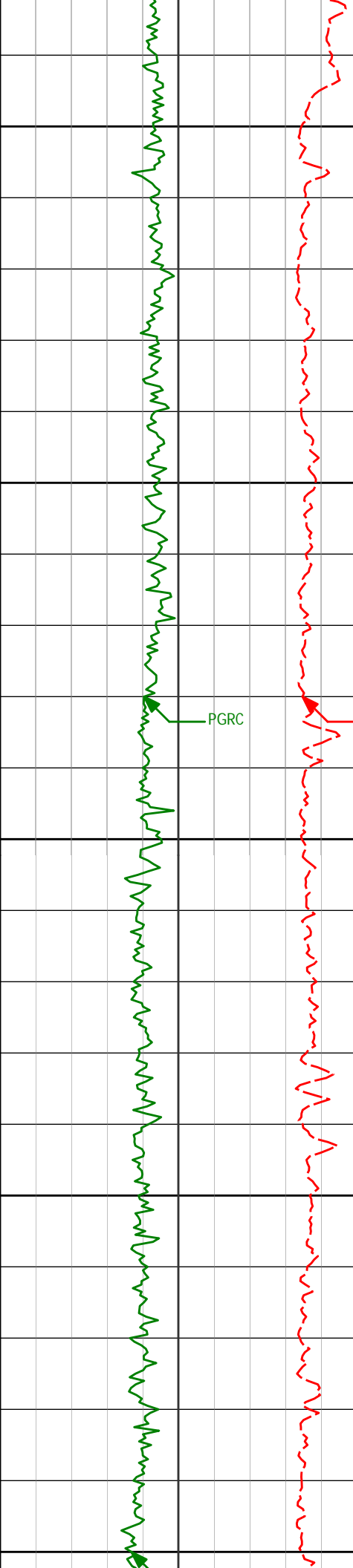
TVD Main Log 1:600

Noble Energy
Wells Ranch AA24-67-HN
H&P 321
T6N R63W





	6002'	12.81°	86.86°	5931.44'	84.19'
5950					
	6050'	16.50°	84.38°	5977.87'	96.09'
6000					
	6097'	19.30°	85.49°	6022.59'	110.22'
6050					
	6145'	21.45°	89.39°	6067.58'	126.70'
6100					
	6192'	25.06°	91.40°	6110.76'	145.13'
6150					
	6240'	28.06°	92.13°	6153.69'	166.50'
6200					
	6287'	31.20°	91.78°	6194.54'	189.65'
6250					
	6335'	36.57°	90.58°	6234.38'	216.26'
	6382'	41.15°	89.50°	6270.96'	245.53'
6300					
	6430'	45.94°	89.69°	6305.75'	278.31'
6350					
	6476'	51.30°	88.74°	6336.15'	312.50'
	6524'	54.38°	89.23°	6365.14'	350.39'
6400					
	6571'	59.74°	89.51°	6390.68'	389.48'
	6619'	65.69°	89.44°	6412.68'	431.76'
	6666'	68.28°	89.19°	6431.05'	474.63'
6450					
	6714'	70.24°	88.44°	6448.05'	519.07'
	6761'	72.26°	88.34°	6463.16'	563.08'



5800

5907'

5.02°

95.66°

5837.74'

69.11'

5850

5955'

9.59°

89.35°

5885.34'

75.17'

5900

6002'

12.81°

86.86°

5931.44'

84.19'

5950

6050'

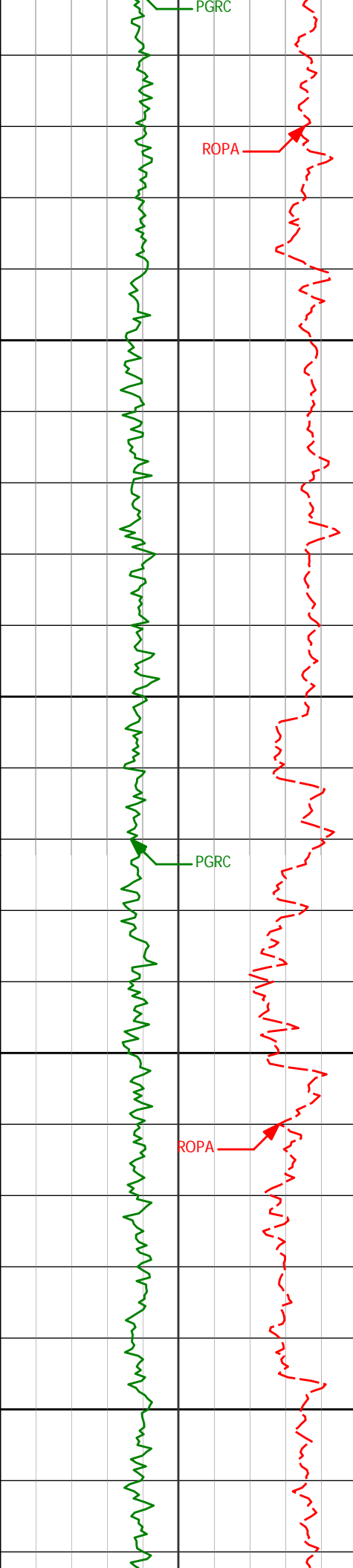
16.50°

84.38°

5977.87'

96.09'

6000



6050

6100

6150

6200

6097'

19.30°

85.49°

6022.59'

110.22'

6145'

21.45°

89.39°

6067.58'

126.70'

6192'

25.06°

91.40°

6110.76'

145.13'

6240'

28.06°

92.13°

6153.69'

166.50'

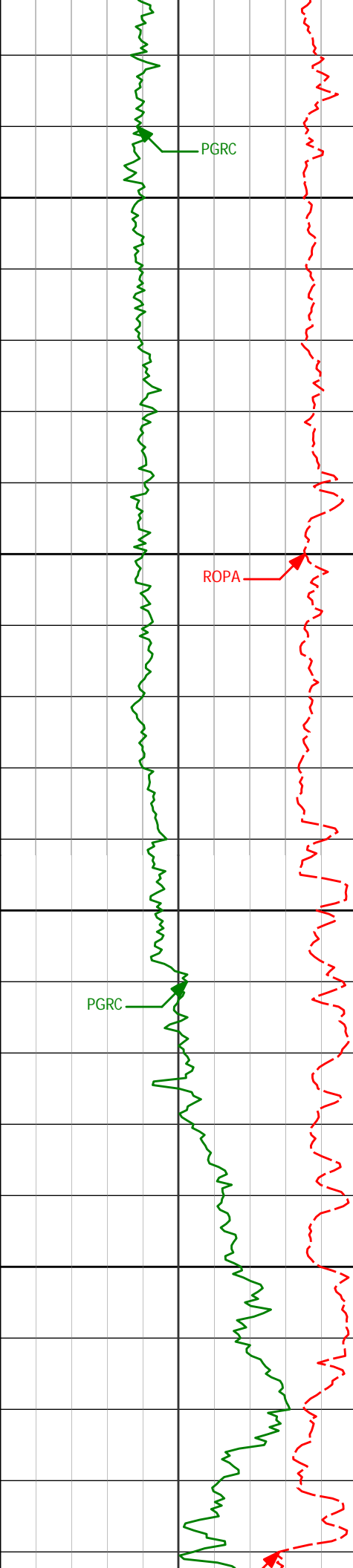
6287'

31.20°

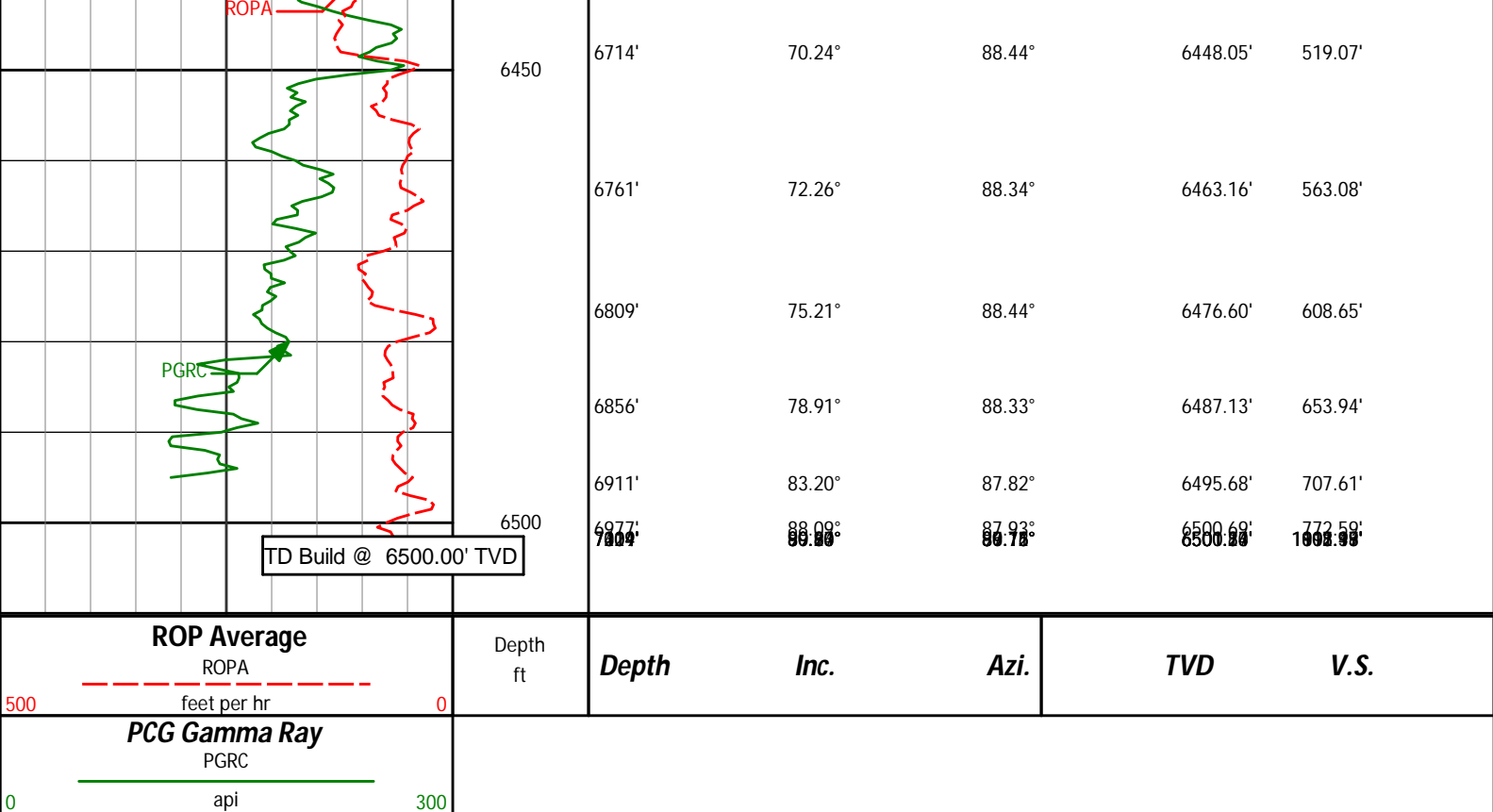
91.78°

6194.54'

189.65'



6335'	36.57°	90.58°	6234.38'	216.26'
6250				
6382'	41.15°	89.50°	6270.96'	245.53'
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6571'	59.74°	89.51°	6390.68'	389.48'
6400				
6619'	65.69°	89.44°	6412.68'	431.76'
6666'	68.28°	89.19°	6431.05'	474.63'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AA24-67-1HN-A2
Wattenburg
Weld Colorado
USA
CA-XX-0009691517

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
657.00	0.00	0.00	657.00	0.00 N	0.00 E	0.00	TIE-IN
817.00	0.15	344.08	817.00	0.21 N	0.06 W	-0.08	0.10
1101.00	0.43	39.08	1101.00	1.40 N	0.51 E	0.34	0.13
1382.00	0.66	355.93	1381.98	3.85 N	1.06 E	0.59	0.16
1474.00	0.40	358.61	1473.98	4.70 N	1.02 E	0.45	0.29
1566.00	2.51	190.35	1565.95	3.03 N	0.65 E	0.28	3.16
1658.00	5.20	187.74	1657.74	3.08 S	0.28 W	0.10	2.92
1750.00	6.92	181.38	1749.22	12.75 S	0.97 W	0.57	2.01
1842.00	8.73	178.91	1840.36	25.28 S	0.97 W	2.08	1.99
1934.00	10.67	182.11	1931.04	40.77 S	1.15 W	3.76	2.19
2026.00	12.68	182.94	2021.14	59.36 S	1.98 W	5.17	2.20
2118.00	14.27	178.00	2110.60	80.78 S	2.11 W	7.63	2.13
2210.00	15.21	180.55	2199.58	104.18 S	1.83 W	10.72	1.24
2302.00	14.06	181.09	2288.59	127.41 S	2.16 W	13.19	1.26
2394.00	15.22	178.06	2377.60	150.66 S	1.96 W	16.18	1.52
2486.00	15.42	180.71	2466.33	174.96 S	1.70 W	19.36	0.79
2581.00	16.37	179.52	2557.70	200.98 S	1.74 W	22.45	1.06
2676.00	15.03	178.75	2649.15	226.69 S	1.36 W	25.92	1.43
2771.00	16.11	175.65	2740.67	252.14 S	0.09 W	30.24	1.43
2866.00	14.99	174.36	2832.19	277.51 S	2.11 E	35.49	1.23
2961.00	15.46	178.00	2923.86	302.40 S	3.76 E	40.12	1.12
3056.00	15.62	177.46	3015.38	327.82 S	4.77 E	44.18	0.23
3151.00	13.99	177.55	3107.23	352.07 S	5.83 E	48.14	1.71
3245.00	15.96	176.28	3198.03	376.32 S	7.15 E	52.37	2.13
3340.00	14.05	176.23	3289.79	400.86 S	8.76 E	56.92	2.01

3435.00	14.28	182.22	3381.91	424.08 S	9.06 E	60.02	1.56
3530.00	13.45	186.42	3474.14	446.76 S	7.37 E	61.07	1.37
3625.00	12.66	192.65	3566.69	467.90 S	3.86 E	60.12	1.70
3720.00	12.89	191.34	3659.34	488.45 S	0.51 W	58.26	0.39
3815.00	13.91	189.80	3751.75	510.09 S	4.54 W	56.87	1.13
3909.00	12.06	187.55	3843.34	530.97 S	7.75 W	56.19	2.03
4004.00	9.91	176.38	3936.61	548.97 S	8.54 W	57.57	3.18
4099.00	6.62	171.83	4030.61	562.55 S	7.24 W	60.49	3.53
4194.00	3.59	199.81	4125.23	570.77 S	7.47 W	61.25	4.04
4289.00	2.94	197.42	4220.08	575.90 S	9.21 W	60.14	0.70
4384.00	0.90	286.16	4315.03	578.01 S	10.65 W	58.96	3.21
4668.00	0.37	278.74	4599.01	577.25 S	13.69 W	55.85	0.19
4953.00	0.36	176.31	4884.01	578.00 S	14.54 W	55.10	0.20
5238.00	0.52	166.27	5169.00	580.16 S	14.18 W	55.73	0.06
5522.00	1.24	119.70	5452.97	582.94 S	11.20 W	59.01	0.34
5710.00	1.62	141.22	5640.91	586.02 S	7.78 W	62.78	0.35
5812.00	1.12	150.44	5742.88	588.01 S	6.39 W	64.40	0.53
5907.00	5.02	95.66	5837.74	589.22 S	1.79 W	69.11	4.70
5955.00	9.59	89.35	5885.34	589.39 S	4.29 E	75.17	9.65
6002.00	12.81	86.86	5931.44	589.06 S	13.42 E	84.19	6.94
6050.00	16.50	84.38	5977.87	588.10 S	25.52 E	96.09	7.78
6097.00	19.30	85.49	6022.59	586.83 S	39.91 E	110.22	6.01
6145.00	21.45	89.39	6067.58	586.11 S	56.59 E	126.70	5.29
6192.00	25.06	91.40	6110.76	586.26 S	75.14 E	145.13	7.86
6240.00	28.06	92.13	6153.69	586.93 S	96.59 E	166.50	6.29
6287.00	31.20	91.78	6194.54	587.72 S	119.81 E	189.65	6.70
6335.00	36.57	90.58	6234.38	588.25 S	146.55 E	216.26	11.27
6382.00	41.15	89.50	6270.96	588.26 S	176.03 E	245.53	9.86
6430.00	45.94	89.69	6305.75	588.03 S	209.09 E	278.31	9.98
6476.00	51.30	88.74	6336.15	587.54 S	243.59 E	312.50	11.75
6524.00	54.38	89.23	6365.14	586.87 S	281.83 E	350.39	6.49
6571.00	59.74	89.51	6390.68	586.44 S	321.26 E	389.48	11.41
6619.00	65.69	89.44	6412.68	586.04 S	363.89 E	431.76	12.39
6666.00	68.28	89.19	6431.05	585.52 S	407.15 E	474.63	5.54
6714.00	70.24	88.44	6448.05	584.59 S	452.02 E	519.07	4.33
6761.00	72.26	88.34	6463.16	583.34 S	496.51 E	563.08	4.31
6809.00	75.21	88.44	6476.60	582.05 S	542.56 E	608.65	6.14
6856.00	78.91	88.33	6487.13	580.75 S	588.34 E	653.94	7.87
6911.00	83.20	87.82	6495.68	578.93 S	642.63 E	707.61	7.86

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 96.91 DEGREES (GRID)
A TOTAL CORRECTION OF 7.85 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6911.00 FEET
IS 864.95 FEET ALONG 132.01 DEGREES (GRID)**