HALLIBURTON | Sperry Drilling

PCGK: Pressure Case Gamma
PCDC: Pressure Case Directional

Powered by INSITE™

1 : 600 / 1 : 240

Country : **USA**
Field : **Wattenberg**
Location : **Lat: 40°30' 21.53" North Long: 104°22' 32.48" West**
Well : **Wells Ranch AA12-68-1HN**
Company : **Noble Energy**
Rig : **H&P 315**

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Well : **Wells Ranch AA12-68-1HN**
Field : **Wattenberg**
Country : **USA**
API Number : **0512335630**

LOCATION
Latitude : **40°30' 21.53" North**
Longitude : **104°22' 32.48" West**
UTM Easting = **3,312,634.38 ft**
UTM Northing = **1,429,151.22 ft**

Other Services
Directional Drilling

Permanent Datum :
Log Measured From : **Drill Floor**
Drilling Measured From : **Drill Floor**

Elevation : **4893.00 ft**
24.00 ft Above Permanent Datum

TVD LOG

Elev. KB **N/A**
DF **4917.00 ft**
GL **4893.00 ft**
WD **N/A**

Depth Logged : **707.00 ft** To **6,689.92 ft**
Date Logged : **22-Sep-12** To **24-Sep-12**
Total Depth MD : **7,125.00 ft** TVD : **6,689.92 ft**
Spud Date : **21-Sep-12**

Unit No. : **11610113**
Job No. : **CA-XX-0009759276**

Plot Type : **Final**
Plot Date : **25-Sep-12**

Run No.	Borehole Record (TVD) Size	From	To
2	8.750 in	707.00 ft	5,917.10 ft
3	8.750 in	5,917.10 ft	6,689.92 ft

Run No.	Borehole Record (TVD) Size	From	To

Casing Record (TVD)

Size	Weight	From	To
7.000 in	26.00 lbpf	SURFACE	6,689.71 ft

WELL INFORMATION

MWD Run Number	100	200
Date run completed	23-Sep-12	24-Sep-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)	707.00	5,917.10
Log End Depth (TVD, ft)	5,917.10	6,689.92
Drill or Wipe	Drill	Drill
Drill/Wipe Start Date and Time	22-Sep-12 08:50	23-Sep-12 06:00
Drill/Wipe End Date and Time	22-Sep-12 23:30	24-Sep-12 05:20
Min Inc (deg) @ Depth (TVD, ft)	.18 @ 5,521.10	.35 @ 5,922.10
Max Inc (deg) @ Depth (TVD, ft)	10.41 @ 2,680.07	89.10 @ 6,689.92
Bit TFA(in2) / Bit Type	.75 / PDC	.75 / PDC
Flow Rate (gpm)	593.00	585.00
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)	8.50 / 27.00	10.50 / 36.00
Filtrate CL (ppm)	1,500.00	1,500.00
pH / Fluid Loss (mptm)	10.30 / 0	9.50 / 8
PV (cP) / YP (lhf2)	1 / 4.00	10 / 11.00
% Solids / % Sand	1 / 0.25	11 / 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 (degF) / Source	145.90 / PCM	175.40 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Paul Kock	Paul Kock			
Customer Representative	Dave Nielsen	Dave Nielsen			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.76	5.76			
Sub Serial Number	11404279	11404279			
Insert Serial Number	11145558	11145558			
Date and Time Initialized	22-Sep-12 04:06	22-Sep-12 04:06			
Date and Time Read	24-Sep-12 10:36	24-Sep-12 10:43			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	55.67	52.80			
Software Version	6.21	6.21			
Sub Serial Number	11404279	11404279			
Sonde Serial Number	11478107	11478107			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	326.51	294.40			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	50.87	48.00			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404279	11404279			
Insert/Sonde Serial Number	11579773	11579773			

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 7.4.01

WARRANTY

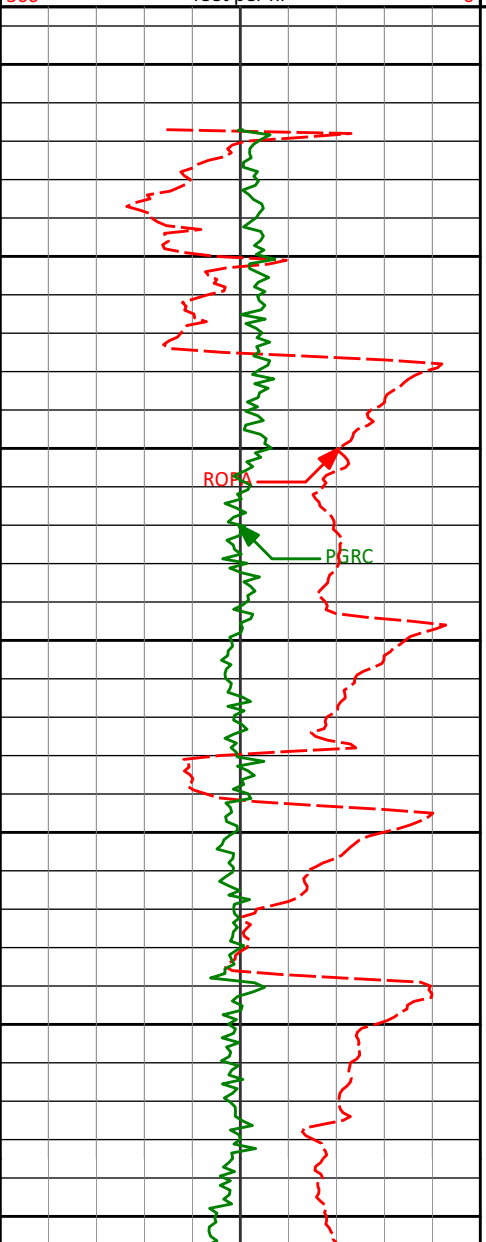
HALLIBURTON
Sperry Drilling Services

TVD Main Log 1:600

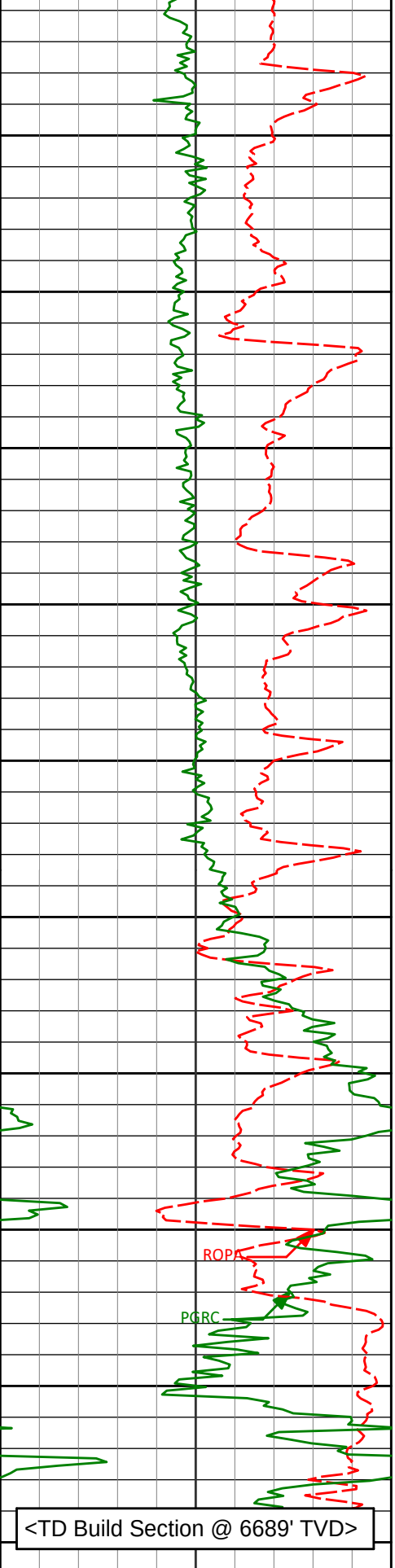
Noble Energy, Inc
Wells Ranch AA12-68-1HN
H&P 315
T6N R63W

PCG Gamma Ray
PGRC
0 api 300

Avg Rate of Penetration
ROPA
500 feet per hr 0



Depth ft	*Depth*	*Inc.*	*Azi.*	*TVD*	*V.S.*
5900					
<Run 200>	5933'	0.35°	70.99°	5922.10'	-125.85'
5950					
<KOP>					
6000					
	6051'	7.32°	257.20°	6039.80'	-118.80'
6050					
	6098'	10.12°	259.63°	6086.25'	-111.77'
6100					
6150					
	6193'	16.05°	261.03°	6178.74'	-90.46'
6200					



Depth	Inc.	Azi.	TVD	V.S.
6287'	22.21°	262.34°	6267.51'	-59.85'
6382'	27.88°	262.48°	6353.54'	-19.83'
6430'	31.23°	260.25°	6395.29'	3.68'
6477'	34.66°	258.58°	6434.73'	28.95'
6525'	39.46°	256.28°	6473.02'	57.38'
6573'	43.92°	254.92°	6508.86'	88.56'
6621'	49.16°	254.30°	6541.86'	122.46'
6667'	53.92°	255.12°	6570.46'	157.52'
6715'	60.02°	255.90°	6596.62'	196.80'
6762'	65.10°	259.09°	6618.27'	237.81'
6810'	69.03°	262.00°	6636.98'	281.64'
6857'	73.42°	264.58°	6652.10'	325.98'
6905'	77.24°	268.79°	6664.26'	372.39'
6952'	80.12°	273.13°	6673.49'	418.39'
7000'	82.64°	274.41°	6680.69'	465.59'
7070'	86.05°	274.41°	6687.59'	534.79'

Avg Rate of Penetration
ROPA
500 feet per hr 0

PCG Gamma Ray
PGRC

Depth ft

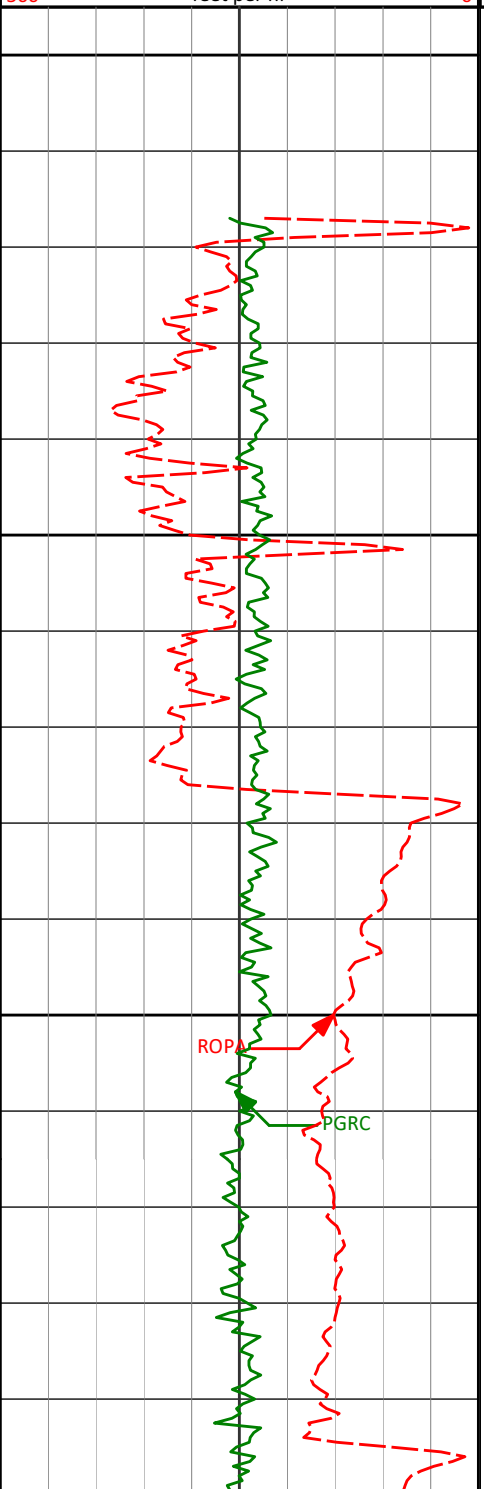
0 api 300

HALLIBURTON
Sperry Drilling Services
TVD Detail Log 1:240

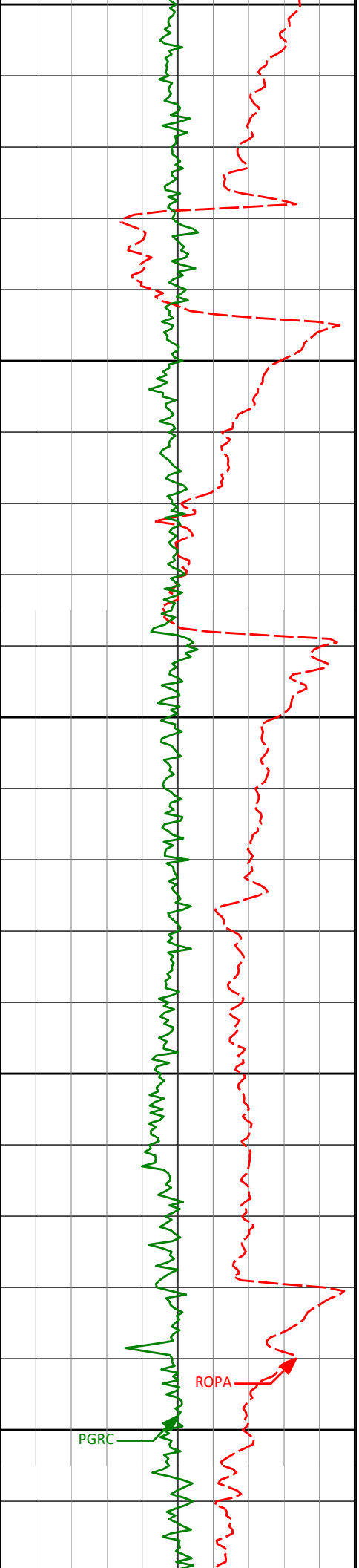
Noble Energy, Inc
Wells Ranch AA12-68-1HN
H&P 315
T6N R63W

PCG Gamma Ray
PGRC
0 api 300

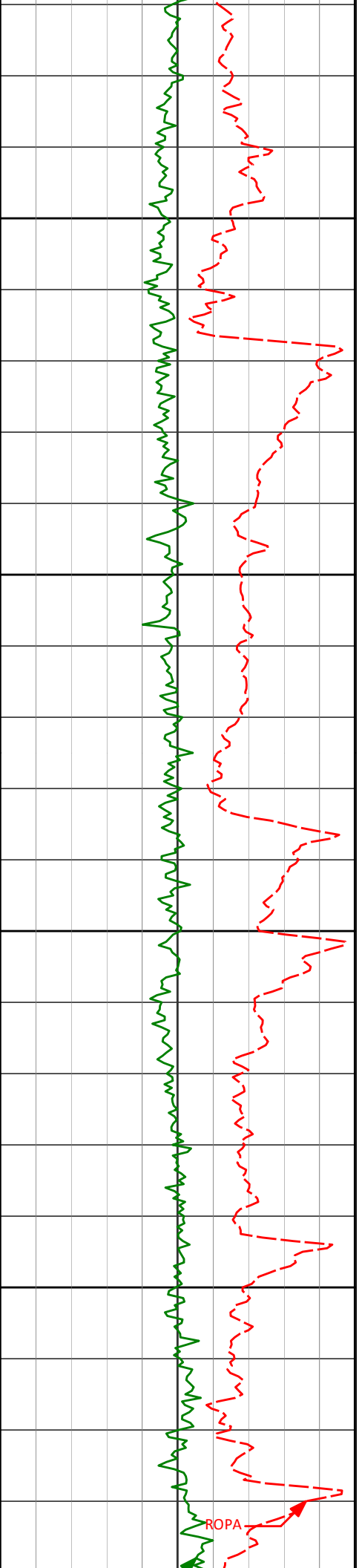
Avg Rate of Penetration
ROPA
500 feet per hr 0



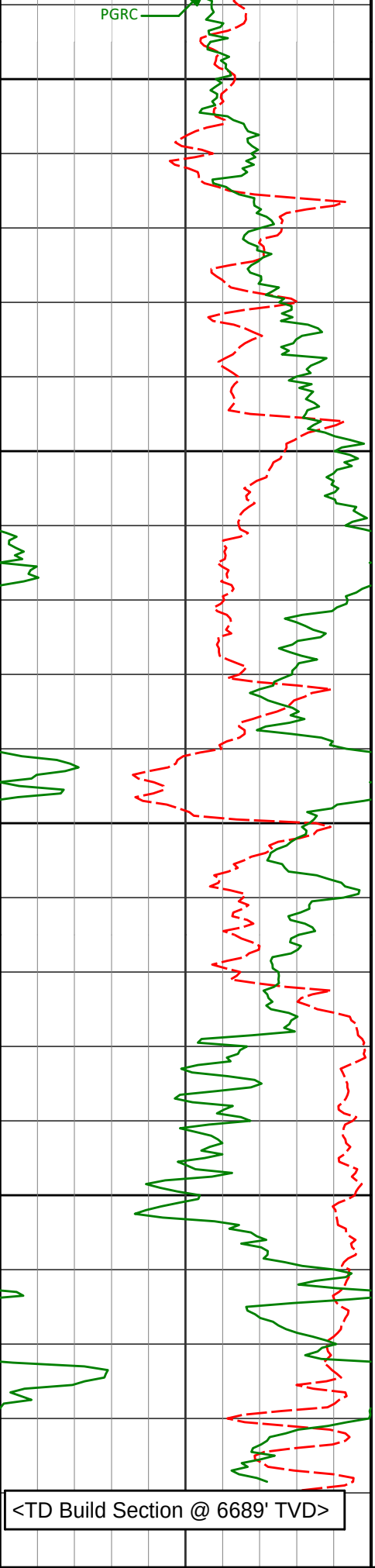
Depth ft	*Depth*	*Inc.*	*Azi.*	*TVD*	*V.S.*
5900					
<Run 200>					
	5933'	0.35°	70.99°	5922.10'	-125.85'
5950					
<KOP>					
6000					
	6051'	7.32°	257.20°	6039.80'	-118.80'



6098'	10.12°	259.63°	6086.25'	-111.77'
6193'	16.05°	261.03°	6178.74'	-90.46'
6287'	22.21°	262.34°	6267.51'	-59.85'



6382'	27.88°	262.48°	6353.54'	-19.83'
6430'	31.23°	260.25°	6395.29'	3.68'
6477'	34.66°	258.58°	6434.73'	28.95'
6525'	39.46°	256.28°	6473.02'	57.38'



Depth	Inc.	Azi.	TVD	V.S.
6573'	43.92°	254.92°	6508.86'	88.56'
6621'	49.16°	254.30°	6541.86'	122.46'
6667'	53.92°	255.12°	6570.46'	157.52'
6715'	60.02°	255.90°	6596.62'	196.80'
6762'	65.10°	259.09°	6618.27'	237.81'
6810'	69.03°	262.00°	6636.98'	281.64'
6857'	73.42°	264.58°	6652.10'	325.98'
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6952'	80.12°	273.13°	6673.49'	418.39'
7000'	82.64°	274.41°	6680.69'	465.59'
7070'	86.05°	274.41°	6687.59'	534.79'

Avg Rate of Penetration

ROPA

Depth
ft

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

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AA12-68-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0009759276
Survey depth 694 ft created to tie surveys onto bottom of the surface casing shoe.

Last survey is a projection to TD.

Measured Depth (feet)	*Inclination (degrees)*	*Direction (degrees)*	*Vertical Depth (feet)*	*Latitude (feet)*	*Departure (feet)*	*Vertical Section (feet)*	*Dogleg (deg/100ft)*
694.00	0.00	0.00	694.00	0.00 N	0.00 E	0.00	TIE-IN
802.00	0.74	221.75	802.00	0.52 S	0.47 W	0.48	0.69
1080.00	0.47	236.55	1079.98	2.49 S	2.61 W	2.70	0.11
1172.00	1.55	346.66	1171.97	1.48 S	3.20 W	3.26	1.92
1453.00	2.22	13.87	1452.82	7.50 N	2.78 W	2.50	0.39
1643.00	0.62	229.11	1642.78	10.41 N	2.67 W	2.28	1.45
1927.00	0.93	168.16	1926.76	7.16 N	3.35 W	3.08	0.29
2022.00	2.99	144.82	2021.70	4.38 N	1.76 W	1.60	2.29
2117.00	4.25	116.58	2116.52	0.78 N	2.81 E	-2.84	2.26
2212.00	5.40	128.80	2211.18	3.59 S	9.44 E	-9.30	1.62
2307.00	6.77	140.16	2305.65	10.69 S	16.51 E	-16.11	1.91
2402.00	8.00	131.34	2399.86	19.36 S	25.06 E	-24.34	1.76
2496.00	9.25	138.36	2492.80	29.33 S	34.99 E	-33.90	1.74
2591.00	9.63	135.11	2586.51	40.66 S	45.68 E	-44.15	0.69
2686.00	10.41	129.15	2680.07	51.71 S	57.94 E	-56.00	1.36
2781.00	9.44	125.70	2773.64	61.67 S	70.92 E	-68.61	1.20
2876.00	7.99	121.66	2867.55	69.68 S	82.86 E	-80.25	1.65
2970.00	7.36	130.35	2960.71	77.01 S	93.01 E	-90.13	1.40
3065.00	6.47	132.51	3055.01	84.57 S	101.60 E	-98.43	0.98
3160.00	3.64	136.13	3149.64	90.36 S	107.63 E	-104.25	3.00
3255.00	3.19	138.29	3244.47	94.50 S	111.48 E	-107.94	0.49
3350.00	2.54	133.90	3339.35	97.93 S	114.75 E	-111.09	0.72
3445.00	2.11	130.52	3434.27	100.53 S	117.60 E	-113.83	0.48
3539.00	1.34	67.31	3528.23	101.23 S	119.93 E	-116.14	2.04
3824.00	1.02	95.38	3813.18	100.18 S	125.52 E	-121.77	0.23
4109.00	0.64	49.87	4098.15	99.39 S	129.26 E	-125.53	0.26
4393.00	0.25	15.63	4382.14	97.77 S	130.64 E	-126.97	0.16
4678.00	0.68	214.80	4667.13	98.57 S	129.83 E	-126.14	0.32
4963.00	0.49	180.93	4952.12	101.18 S	128.85 E	-125.05	0.14
5247.00	0.53	163.21	5236.11	103.65 S	129.20 E	-125.32	0.06
5532.00	0.18	270.78	5521.10	104.90 S	129.14 E	-125.21	0.21
5816.00	0.23	112.14	5805.10	105.11 S	129.23 E	-125.29	0.14
5933.00	0.35	70.99	5922.10	105.09 S	129.79 E	-125.85	0.20
6051.00	7.32	257.20	6039.80	106.64 S	122.79 E	-118.80	6.50
6098.00	10.12	259.63	6086.25	108.04 S	115.81 E	-111.77	6.00
6193.00	16.05	261.03	6178.74	111.60 S	94.61 E	-90.46	6.25
6287.00	22.21	262.34	6267.51	115.99 S	64.14 E	-59.85	6.57
6382.00	27.88	262.48	6353.54	121.30 S	24.30 E	-19.83	5.96
6430.00	31.23	260.25	6395.29	124.88 S	0.90 E	3.68	7.36
6477.00	34.66	258.58	6434.73	129.59 S	24.22 W	28.95	7.54
6525.00	39.46	256.28	6473.02	135.91 S	52.43 W	57.38	10.41
6573.00	43.92	254.92	6508.86	143.87 S	83.34 W	88.56	9.48
6621.00	49.16	254.30	6541.86	153.12 S	116.92 W	122.46	10.96
6667.00	53.92	255.12	6570.46	162.61 S	151.66 W	157.52	10.43
6715.00	60.02	255.90	6596.62	172.67 S	190.60 W	196.80	12.78
6762.00	65.10	259.09	6618.27	181.67 S	231.31 W	237.81	12.37
6810.00	69.03	262.00	6636.98	188.91 S	274.90 W	281.64	9.91

6857.00	73.42	264.58	6652.10	194.10 S	319.08 W	325.98	10.67
6905.00	77.24	268.79	6664.26	196.77 S	365.42 W	372.39	11.64
6952.00	80.12	273.13	6673.49	195.99 S	411.48 W	418.39	10.93
7000.00	82.64	274.41	6680.69	192.87 S	458.83 W	465.59	5.87
7070.00	86.05	274.41	6687.59	187.51 S	528.28 W	534.79	4.87
7125.00	89.10	274.00	6689.92	183.48 S	583.07 W	589.40	5.60

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 CLOSURE OF 252.53 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 7125.00 FEET
IS 611.26 FEET ALONG 252.53 DEGREES (GRID)

Date Printed:25 September 2012