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° 24' 35.53" North Long: 104° 32' 40.52" West
Well	: Seyler B10-63-1HN
Company	: Noble Energy
Rig	: H&P 315

Company : **Noble Energy**
Rig : **H&P 315**
Well : **Seyler B10-63-1HN**
Field : **Wattenberg**
Country : **USA**
API Number : **05-123-37698**

LOCATION

Latitude : **40° 24' 35.53" North**
Longitude : **104° 32' 40.52" West**
UTM Easting = **3,266,048.003 ft**
UTM Northing = **1,393,589.059 ft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level** Elevation : **4583.00 ft**
Log Measured From : **Drill Floor** **24.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

TVD LOG

Elev. KB **N/A**
DF **4607.00 ft**
GL **4583.00 ft**
WD **N/A**

Depth Logged : **623.97 ft** To **6,573.31 ft**
Date Logged : **15-Dec-13** To **18-Dec-13**
Total Depth MD : **6,933.00 ft** TVD : **6,573.31 ft**
Spud Date : **13-Dec-13**

Unit No. : **11610113**
Job No. : **CA-XX-0900916997**
Plot Type : **Final**
Plot Date : **20-Dec-13**

Run No.	Borehole Record (TVD) Size	From	To
2	8.750 in	623.97 ft	5,907.04 ft
3	8.750 in	5,907.04 ft	6,573.31 ft

Run No.	Borehole Record (TVD) Size	From	To

Casing Record (TVD) Size	Weight	From	To
7.000 in	26.00 lbpf	SURFACE	6,573.12 ft

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	17-Dec-13	18-Dec-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)	623.97	5,907.04			
Log End Depth (TVD, ft)	5,907.04	6,573.31			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	15-Dec-13 13:00	17-Dec-13 18:30			
Drill/Wipe End Date and Time	17-Dec-13 04:20	18-Dec-13 12:10			
Min Inc (deg) @ Depth (TVD, ft)	0.16 @ 1,084.96	10.83 @ 5,981.33			
Max Inc (deg) @ Depth (TVD, ft)	10.71 @ 2,675.50	82.33 @ 6,568.52			
Bit TFA(in2) / Bit Type	0.78 / PDC	0.94 / PDC			
Flow Rate (gpm)	589.98	531.90			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Polymer	Polymer			
Density (ppg) / Viscosity (spqt)	9.25 / 35.00	10.90 / 38.00			
Filtrate CL (ppm)	600.00	1,000.00			
pH / Fluid Loss (mptm)	8.40 / 10	9.40 / 9			
PV (cP) / YP (lhf2)	9 / 7.00	10 / 9.00			
% Solids / % Sand	4.7 / 0.75	12.1 / 1.00			
% 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	149.10 / PCM	163.20 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Henry Schmeidler	Henry Schmeidler			
Customer Representative	Steve Record	Steve Record			

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	14-Dec-13 12:05	14-Dec-13 12:05			
Date and Time Read	18-Dec-13 22:33	18-Dec-13 22:47			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	54.41	51.98			
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)	278.83	35.68			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.41	46.98			
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

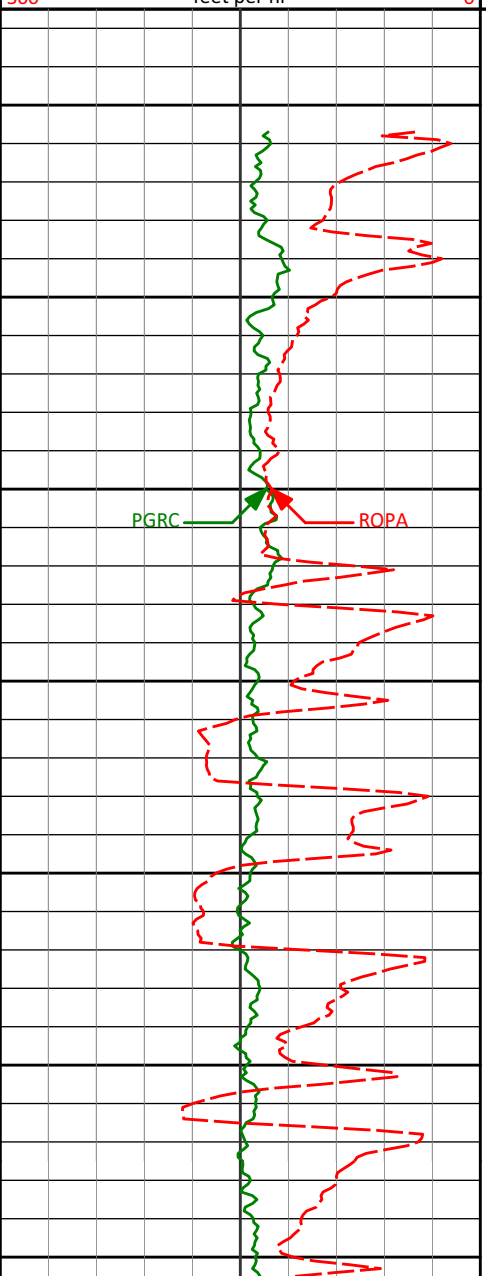
HALLIBURTON
Sperry Drilling Services

TVD Detail Log 1:600

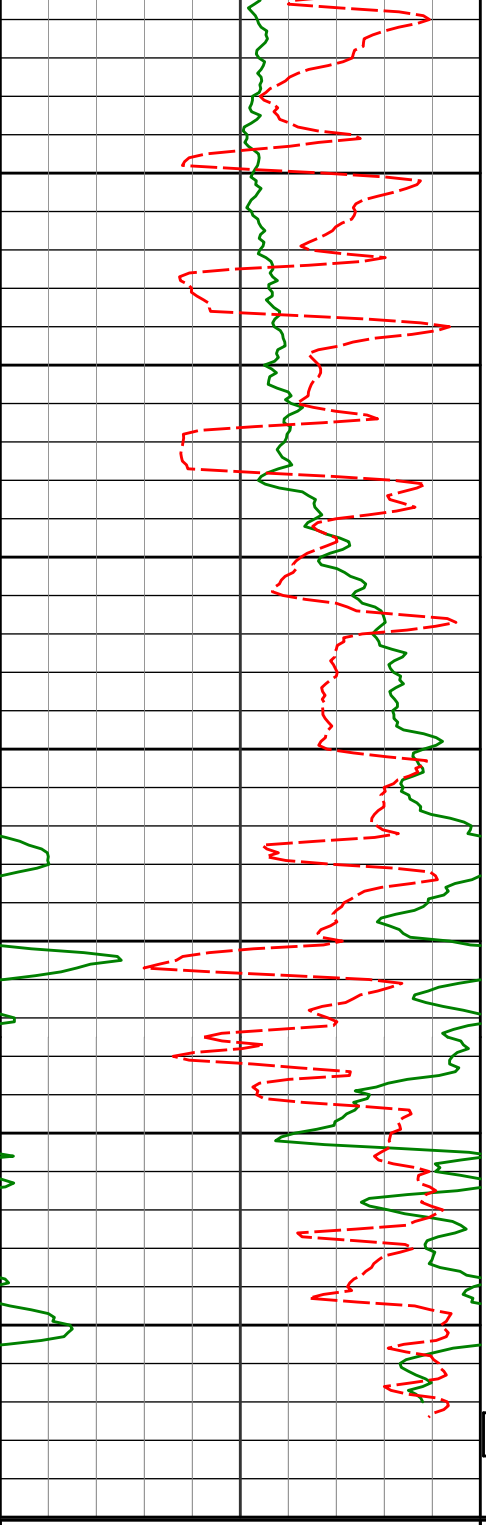
Noble Energy, Inc
Seyler B10-63-1HN
H&P 315
T5N R64W

PCG Gamma Ray
PGRC
0 api 300

Avg Rate of Penetration
ROP Avg
500 feet per hr 0



Depth ft	*Depth*	*Inc.*	*Azi.*	*TVD*	*V.S.*
5900 <Run 200, KOP>					
5950					
	6005'	10.83°	74.22°	5981.33'	-163.34'
6000					
	6053'	18.26°	72.56°	6027.76'	-151.99'
6050					
	6100'	20.32°	77.92°	6072.12'	-137.19'
6100					
	6148'	20.46°	82.45°	6117.12'	-120.88'
6150					
	6195'	23.23°	87.08°	6160.74'	-103.56'
6200					
	6243'	27.30°	89.58°	6204.14'	-83.14'



Depth	Inc.	Azi.	TVD	V.S.
6290'	31.04°	90.97°	6245.17'	-60.26'
6338'	33.44°	90.71°	6285.77'	-34.67'
6385'	35.63°	89.36°	6324.49'	-8.06'
6433'	38.83°	88.71°	6362.70'	20.91'
6480'	45.75°	89.34°	6397.45'	52.45'
6528'	52.33°	90.79°	6428.90'	88.64'
6575'	56.40°	92.84°	6456.28'	126.82'
6623'	57.99°	93.96°	6482.29'	167.16'
6670'	61.27°	90.77°	6506.05'	207.69'
6718'	66.21°	88.78°	6527.29'	250.66'
6765'	72.09°	89.97°	6544.01'	294.49'
6813'	77.12°	89.59°	6556.75'	340.69'
6879'	82.33°	89.97°	6568.52'	405.52'

<TD Build Section @ 6573' TVD>

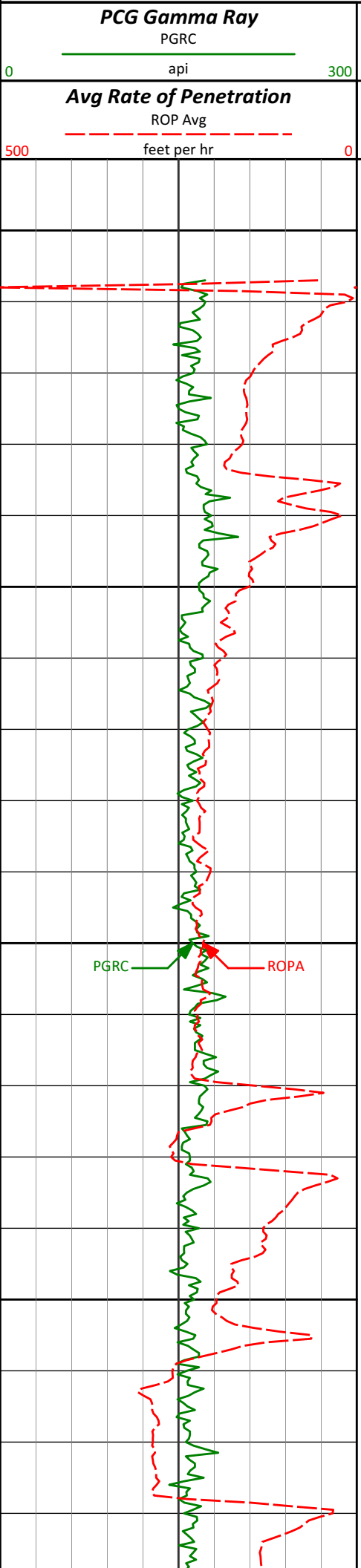
Avg Rate of Penetration
ROP Avg
500 feet per hr 0

PCG Gamma Ray
PGRC
0 api 300

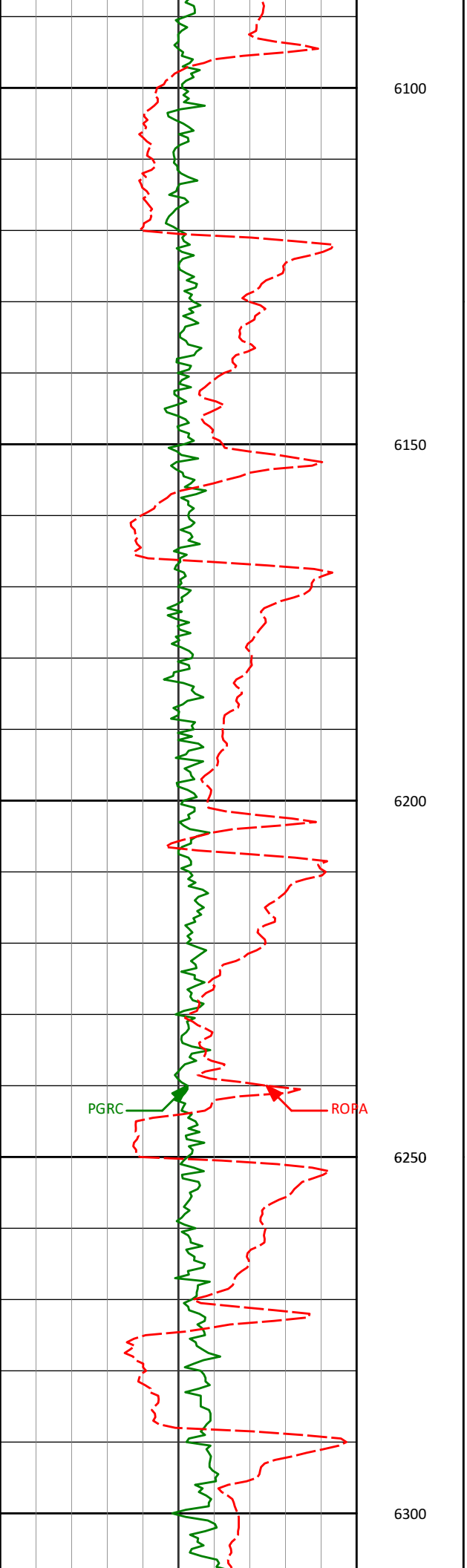
Depth
ft

HALLIBURTON
Sperry Drilling Services
TVD Detail Log 1:240

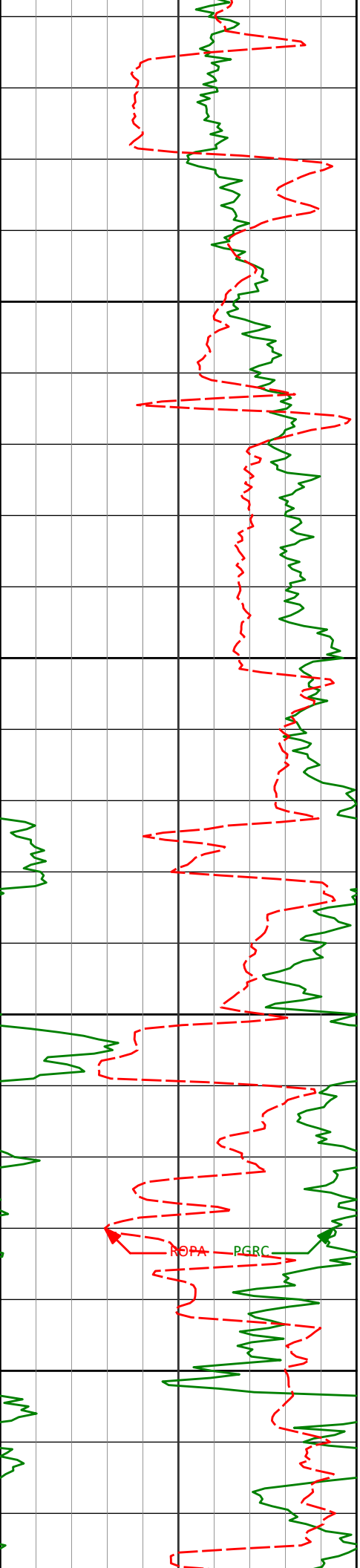
Noble Energy, Inc
Seyler B10-63-1HN
H&P 315
T5N R64W



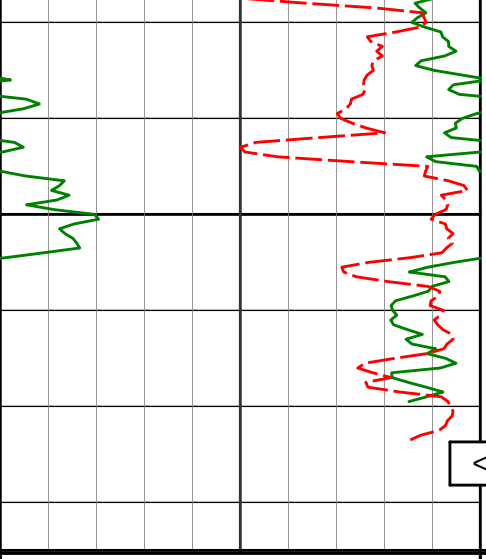
Depth ft	Depth	Inc.	Azi.	TVD	V.S.
5900					
<Run 200, KOP>					
5950					
	6005'	10.83°	74.22°	5981.33'	-163.34'
6000					
	6053'	18.26°	72.56°	6027.76'	-151.99'
6050					
	6100'	20.32°	77.92°	6072.12'	-137.19'



6148'	20.46°	82.45°	6117.12'	-120.88'
6195'	23.23°	87.08°	6160.74'	-103.56'
6243'	27.30°	89.58°	6204.14'	-83.14'
6290'	31.04°	90.97°	6245.17'	-60.26'
6338'	33.44°	90.71°	6285.77'	-34.67'



6385'	35.63°	89.36°	6324.49'	-8.06'
6433'	38.83°	88.71°	6362.70'	20.91'
6480'	45.75°	89.34°	6397.45'	52.45'
6528'	52.33°	90.79°	6428.90'	88.64'
6575'	56.40°	92.84°	6456.28'	126.82'
6623'	57.99°	93.96°	6482.29'	167.16'
6670'	61.27°	90.77°	6506.05'	207.69'
6718'	66.21°	88.78°	6527.29'	250.66'



6765'	72.09°	89.97°	6544.01'	294.49'
6813'	77.12°	89.59°	6556.75'	340.69'
6879'	82.33°	89.97°	6568.52'	405.52'

<TD Build Section @ 6573' TVD>

Avg Rate of Penetration
ROP Avg
500 feet per hr 0

PCG Gamma Ray
PGRC
0 api 300

Depth ft

Depth	***Inc.***	***Azi.***	***TVD***	***V.S.***

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Seyler B10-63-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0900916997

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
304.00	0.80	45.13	303.99	1.50 N	1.50 E	1.43	0.26
582.00	0.40	29.43	581.97	3.71 N	3.36 E	3.17	0.15
715.00	0.39	353.44	714.97	4.57 N	3.53 E	3.31	0.18
808.00	0.33	335.49	807.97	5.13 N	3.39 E	3.13	0.14
899.00	0.48	331.14	898.97	5.70 N	3.09 E	2.82	0.17
993.00	0.81	313.12	992.96	6.50 N	2.42 E	2.10	0.41
1085.00	0.16	279.48	1084.96	6.96 N	1.82 E	1.48	0.75
1178.00	0.37	336.36	1177.96	7.26 N	1.57 E	1.22	0.34
1270.00	3.69	283.26	1269.89	8.21 N	1.43 W	-1.82	3.78
1363.00	5.06	280.62	1362.62	9.65 N	8.37 W	-8.82	1.49
1457.00	6.32	260.92	1456.16	9.60 N	17.55 W	-17.99	2.46
1551.00	5.72	242.68	1549.65	6.63 N	26.82 W	-27.11	2.12
1646.00	6.62	243.97	1644.10	2.06 N	35.95 W	-36.01	0.96
1741.00	6.46	253.97	1738.48	1.82 S	46.00 W	-45.86	1.21
1836.00	6.58	243.98	1832.87	5.68 S	56.03 W	-55.69	1.20
1931.00	7.26	232.08	1927.19	11.76 S	65.65 W	-65.01	1.66
2026.00	8.81	230.68	2021.25	20.05 S	76.01 W	-74.96	1.64
2121.00	8.78	217.35	2115.14	30.42 S	86.04 W	-84.47	2.14
2216.00	9.99	216.20	2208.87	42.84 S	95.30 W	-93.13	1.29
2311.00	9.61	209.00	2302.49	56.42 S	104.01 W	-101.18	1.35
2405.00	10.16	212.92	2395.09	70.24 S	112.32 W	-108.81	0.93
2500.00	10.01	214.59	2488.63	84.07 S	121.56 W	-117.37	0.35
2595.00	10.46	212.84	2582.12	98.11 S	130.92 W	-126.05	0.58
2690.00	10.71	211.88	2675.50	112.85 S	140.26 W	-134.67	0.33
2785.00	9.73	212.07	2768.99	127.15 S	149.19 W	-142.89	1.04
2880.00	9.47	210.03	2862.66	140.72 S	157.36 W	-150.40	0.45
2974.00	8.72	211.04	2955.48	153.53 S	164.91 W	-157.33	0.82

3069.00	8.81	209.52	3049.37	166.02 S	172.21 W	-164.01	0.26
3164.00	8.82	214.14	3143.25	178.38 S	179.87 W	-171.08	0.75
3259.00	7.44	215.01	3237.29	189.44 S	187.49 W	-178.15	1.46
3353.00	5.08	216.93	3330.73	197.74 S	193.48 W	-183.73	2.52
3448.00	3.35	207.86	3425.47	203.56 S	197.30 W	-187.27	1.94
3543.00	2.04	214.42	3520.36	207.41 S	199.55 W	-189.33	1.42
3638.00	0.85	207.19	3615.33	209.43 S	200.83 W	-190.51	1.26
3923.00	0.22	78.87	3900.32	211.21 S	201.27 W	-190.86	0.35
4207.00	1.19	67.40	4184.29	209.98 S	198.02 W	-187.68	0.34
4492.00	1.37	66.26	4469.22	207.47 S	192.17 W	-181.96	0.07
4776.00	0.82	144.48	4753.18	207.74 S	187.88 W	-177.66	0.51
5061.00	0.73	167.66	5038.16	211.16 S	186.31 W	-175.93	0.11
5346.00	1.03	135.55	5323.13	214.76 S	184.13 W	-173.58	0.20
5631.00	0.73	242.57	5608.11	217.43 S	183.94 W	-173.26	0.50
5874.00	0.42	201.96	5851.09	218.96 S	185.64 W	-174.89	0.20
6005.00	10.83	74.22	5981.33	216.05 S	173.94 W	-163.34	8.47
6053.00	18.26	72.56	6027.76	212.56 S	162.41 W	-151.99	15.50
6100.00	20.32	77.92	6072.12	208.65 S	147.41 W	-137.19	5.77
6148.00	20.46	82.45	6117.12	205.80 S	130.94 W	-120.88	3.30
6195.00	23.23	87.08	6160.74	204.25 S	113.53 W	-103.56	6.94
6243.00	27.30	89.58	6204.14	203.69 S	93.06 W	-83.14	8.77
6290.00	31.04	90.97	6245.17	203.81 S	70.15 W	-60.26	8.08
6338.00	33.44	90.71	6285.77	204.18 S	44.55 W	-34.67	5.00
6385.00	35.63	89.36	6324.49	204.19 S	17.91 W	-8.06	4.94
6433.00	38.83	88.71	6362.70	203.69 S	11.12 E	20.91	6.71
6480.00	45.75	89.34	6397.45	203.17 S	42.72 E	52.45	14.75
6528.00	52.33	90.79	6428.90	203.23 S	78.94 E	88.64	13.89
6575.00	56.40	92.84	6456.28	204.46 S	117.11 E	126.82	9.36
6623.00	57.99	93.96	6482.29	206.86 S	157.38 E	167.16	3.85
6670.00	61.27	90.77	6506.05	208.51 S	197.88 E	207.69	9.10
6718.00	66.21	88.78	6527.29	208.33 S	240.91 E	250.66	10.95
6765.00	72.09	89.97	6544.01	207.86 S	284.81 E	294.49	12.73
6813.00	77.12	89.59	6556.75	207.68 S	331.07 E	340.69	10.51
6879.00	82.33	89.97	6568.52	207.43 S	395.99 E	405.52	7.91
6933.00	87.48	89.75	6573.31	207.30 S	449.76 E	459.22	9.55

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 92.76 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 6933.00 FEET
IS 495.23 FEET ALONG 114.75 DEGREES (GRID)

Surface surveys at 304 ft and 582 ft have had azimuths corrected to grid north, but they were not taken by Halliburton.

Last survey is a projection from 6879 ft MD to TD at 6933 ft MD.

Date Printed:20 December 2013