Country : **USA**

Field : **Wattenberg**

Location : **Lat: 40°24' 1.80" North**
Long: 104°31' 6.74" West

Well : **Holman B15-65HNM**

Company : **Noble Energy**

Rig : **H&P 315**

Powered by INSITE™

HALLIBURTON | Sperry Drilling

PCGK: Pressure Case Gamma
PCDC: Pressure Case Directional

Company : **Noble Energy**
Rig : **H&P 315**
Well : **Holman B15-65HNM**
Field : **Wattenberg**
Country : **USA**
API Number : **05-123-37200**

LOCATION

Latitude : **40°24' 1.80" North**
Longitude : **104°31' 6.74" West**
UTM Easting = **3,273,339.177 ft**
UTM Northing = **1,390,255.224 ft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level**
Elevation : **4584.00 ft**
Log Measured From : **Drill Floor**
24.00 ft Above Permanent Datum
Drilling Measured From : **Drill Floor**

Elev. KB **N/A**
DF **4608.00 ft**
GL **4584.00 ft**
WD **N/A**

TVD LOG

Depth Logged : **648.98 ft** To **6,605.90 ft**
Date Logged : **03-Sep-13** To **06-Sep-13**
Total Depth MD : **6,977.00 ft** TVD: **6,605.90 ft**
Spud Date : **02-Sep-13**

Unit No. : **11610113**
Job No. :**CA-XX-0900697468**
Plot Type : **Final**
Plot Date : **08-Sep-13**

Borehole Record (TVD)

Run No.	Size	From	To
2	8.750 in	648.98 ft	5,952.36 ft
3	8.750 in	5,952.36 ft	6,573.31 ft
4	8.750 in	6,573.31 ft	6,605.90 ft

Borehole Record (TVD)

Run No.	Size	From	To

Casing Record (TVD)

Size	Weight	From	To
7.000 in	26.00 lbpf	SURFACE	6,605.90 ft

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	04-Sep-13	05-Sep-13	06-Sep-13		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	8.750		
Tool Nominal OD (in)	6.750	6.750	6.750		
Log Start Depth (TVD, ft)	648.98	5,952.36	6,573.31		
Log End Depth (TVD, ft)	5,952.36	6,573.31	6,605.90		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	03-Sep-13 14:30	05-Sep-13 02:15	06-Sep-13 04:00		
Drill/Wipe End Date and Time	04-Sep-13 16:45	05-Sep-13 15:45	06-Sep-13 07:30		
Min Inc (deg) @ Depth (TVD, ft)	.16 @ 1,085.96	14.04 @ 6,034.15	67.83 @ 6,570.00		
Max Inc (deg) @ Depth (TVD, ft)	12.58 @ 5,896.71	63.76 @ 6,550.73	86.46 @ 6,604.28		
Bit TFA(in2) / Bit Type	.77 / PDC	.75 / PDC	.75 / PDC		
Flow Rate (gpm)	510.90	568.25	550.00		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	9.00 / 39.00	10.40 / 32.00	10.60 / 35.00		
Filtrate CL (ppm)	2,000.00	1,800.00	1,800.00		
pH / Fluid Loss (mptm)	8.70 / 0	9.50 / 11	9.30 / 0		
PV (cP) / YP (lhf2)	3 / 7.00	8 / 4.00	12 / 8.00		
% Solids / % Sand	3.3 / .2	5.2 / .2	10.7 / .2		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		

Max Tool Temp (degF) / Source	158.60 / PCM	172.78 / PCM	175.21 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Paul Kock	Paul Kock	Paul Kock		
Customer Representative	Martin Suarez	Martin Suarez	Martin Suarez		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11254959	11254959	11254959		
Insert Serial Number	10744813	10744813	11400840		
Date and Time Initialized	02-Sep-13 22:38	02-Sep-13 22:38	05-Sep-13 18:59		
Date and Time Read	05-Sep-13 22:20	05-Sep-13 22:26	06-Sep-13 16:28		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	54.66	52.33	52.32		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11254959	11254959	11254959		
Sonde Serial Number	11478007	11478007	12177539		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	196.31	91.60	236.10		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.66	47.33	47.32		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11254959	11254959	11254959		
Insert/Sonde Serial Number	11681026	11681026	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.

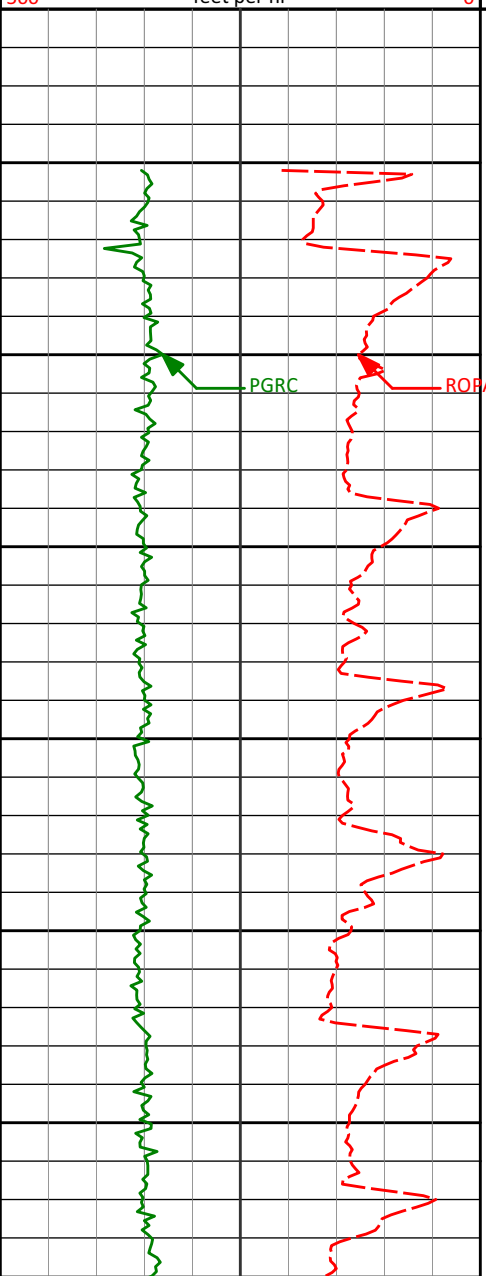
5. INSITE version 7.4.20

WARRANTY

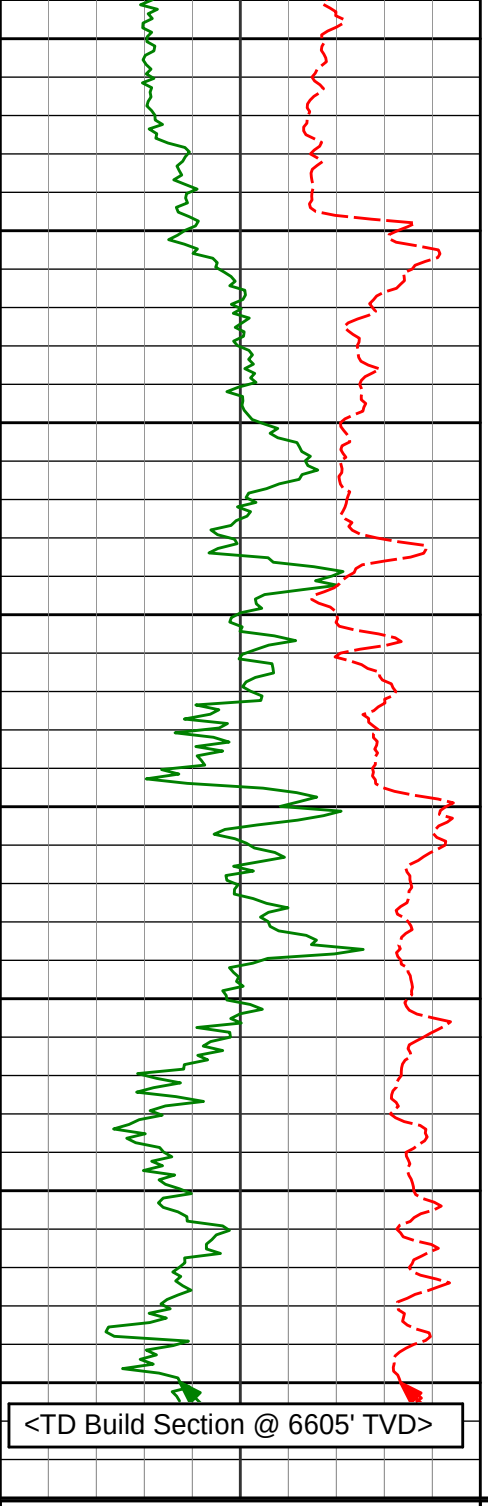
HALLIBURTON
Sperry Drilling Services

TVD Detail Log 1:600

Noble Energy, Inc
Holman B15-65HNM
H&P 315
T5N R64W



Depth ft	Depth	Inc.	Azi.	TVD	V.S.
	5942'	12.38°	189.22°	5922.09'	21.98'
5950					
<Run 200>					
<KOP>					
6000					
	6057'	14.04°	215.62°	6034.15'	33.62'
6050					
	6104'	17.33°	217.02°	6079.39'	41.82'
6100					
	6152'	17.37°	230.97°	6125.23'	52.35'
6150					
	6199'	18.71°	246.37°	6169.94'	65.18'
6200					
	6247'	22.30°	253.03°	6214.90'	81.29'



6250
6300
6350
6400
6450
6500
6550
<Run 300>
6600

Depth	Inc.	Azi.	TVD	V.S.
6294'	25.75°	250.01°	6257.82'	99.79'
6342'	29.58°	248.14°	6300.33'	121.07'
6389'	34.61°	247.74°	6340.13'	144.77'
6437'	39.99°	246.51°	6378.30'	172.25'
6484'	45.05°	243.79°	6412.93'	201.86'
6532'	49.60°	244.79°	6445.46'	234.59'
6579'	52.90°	248.65°	6474.88'	269.14'
6627'	55.47°	252.02°	6502.97'	306.57'
6673'	59.17°	253.88°	6527.81'	344.25'
6721'	63.76°	254.47°	6550.73'	385.48'
6768'	67.83°	253.99°	6570.00'	427.41'
6816'	73.58°	254.80°	6585.85'	471.74'
6863'	79.32°	255.15°	6596.86'	516.53'
6923'	86.46°	257.31°	6604.28'	575.13'

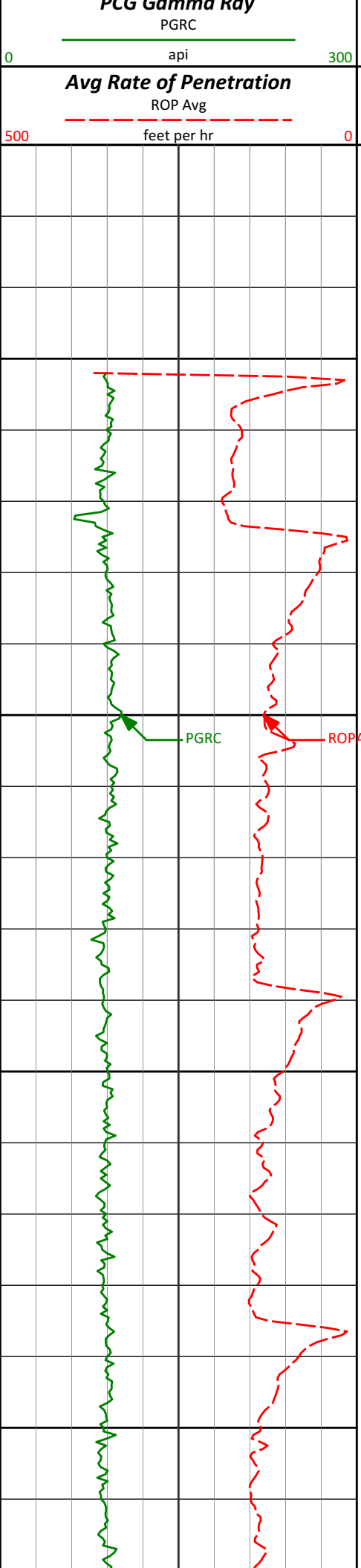
Avg Rate of Penetration
ROP Avg
500 feet per hr 0

Depth
ft

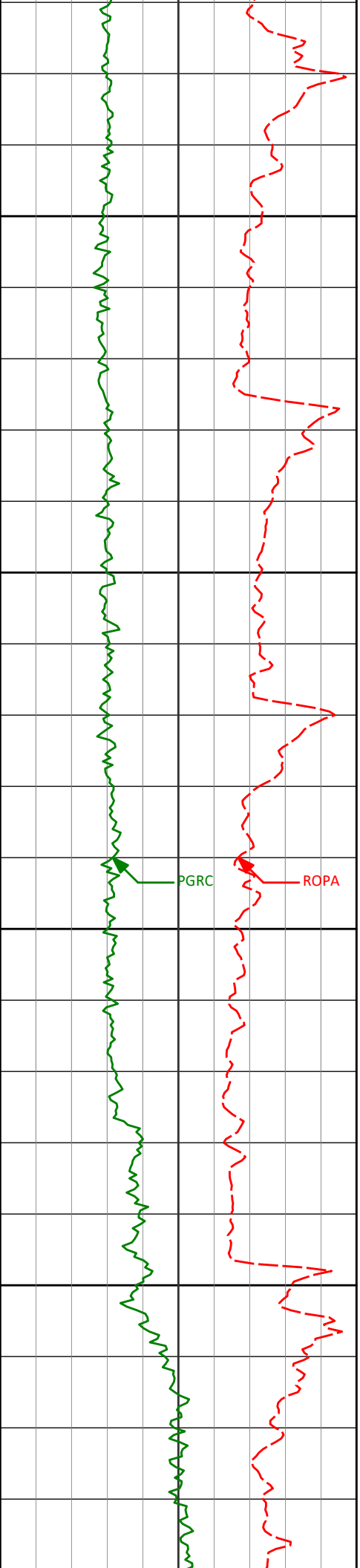
PCG Gamma Ray
PGRC
0 api 300

HALLIBURTON
Sperry Drilling Services
TVD Detail Log 1:240

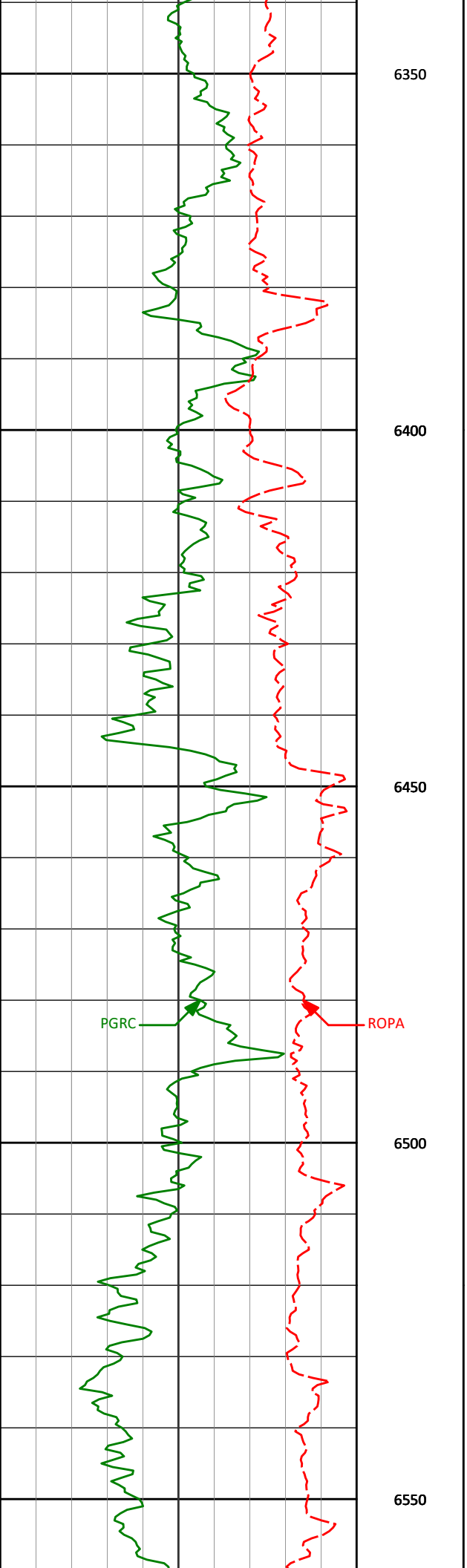
Noble Energy, Inc
Holman B15-65HNM
H&P 315
T5N R64W



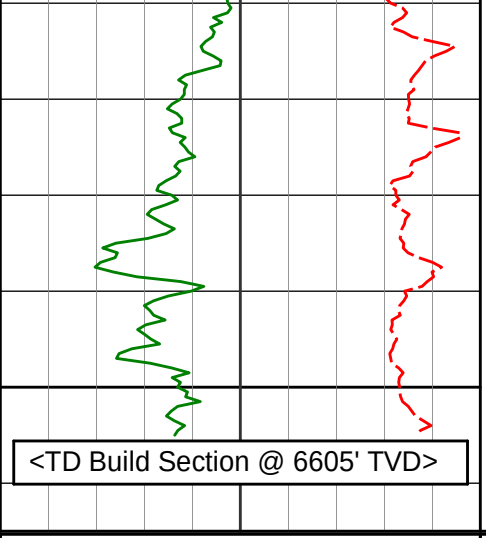
Depth ft	Depth	Inc.	Azi.	TVD	V.S.
	5942'	12.38°	189.22°	5922.09'	21.98'
	6057'	14.04°	215.62°	6034.15'	33.62'
	6104'	17.33°	217.02°	6079.39'	41.82'



6152'	17.37°	230.97°	6125.23'	52.35'
6199'	18.71°	246.37°	6169.94'	65.18'
6247'	22.30°	253.03°	6214.90'	81.29'
6294'	25.75°	250.01°	6257.82'	99.79'
6342'	29.58°	248.14°	6300.33'	121.07'



6389'	34.61°	247.74°	6340.13'	144.77'
6437'	39.99°	246.51°	6378.30'	172.25'
6484'	45.05°	243.79°	6412.93'	201.86'
6532'	49.60°	244.79°	6445.46'	234.59'
6579'	52.90°	248.65°	6474.88'	269.14'
6627'	55.47°	252.02°	6502.97'	306.57'
6673'	59.17°	253.88°	6527.81'	344.25'
6721'	63.76°	254.47°	6550.73'	385.48'



6768'	67.83°	253.99°	6570.00'	427.41'
6816'	73.58°	254.80°	6585.85'	471.74'
6863'	79.32°	255.15°	6596.86'	516.53'
6923'	86.46°	257.31°	6604.28'	575.13'

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
Holman B15-65HNM
Wattenberg
Weld Colorado
USA
CA-XX-0900697468

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	0.50	222.23	304.00	0.98 S	0.89 W	0.95	0.16
612.00	0.50	268.53	611.99	2.01 S	3.14 W	3.26	0.13
715.00	0.54	308.98	714.98	1.72 S	3.96 W	4.07	0.35
900.00	0.74	271.88	899.97	1.13 S	5.84 W	5.90	0.24
993.00	0.58	255.72	992.96	1.23 S	6.89 W	6.96	0.26
1086.00	0.16	131.80	1085.96	1.43 S	7.25 W	7.33	0.73
1178.00	0.48	22.33	1177.96	1.16 S	7.01 W	7.07	0.60
1271.00	0.94	310.80	1270.96	0.30 S	7.44 W	7.44	0.98
1363.00	0.35	81.95	1362.95	0.23 N	7.73 W	7.70	1.30
1456.00	0.44	273.14	1455.95	0.29 N	7.81 W	7.77	0.85
1551.00	1.70	138.01	1550.94	0.74 S	7.23 W	7.26	2.14
1646.00	1.44	138.65	1645.90	2.68 S	5.50 W	5.66	0.27
1741.00	2.14	141.40	1740.86	4.96 S	3.60 W	3.92	0.74
1836.00	2.44	145.35	1835.78	8.01 S	1.35 W	1.87	0.36
1931.00	1.81	109.92	1930.72	10.19 S	1.21 E	-0.54	1.50
2026.00	1.45	43.77	2025.69	9.83 S	3.46 E	-2.80	1.90
2310.00	0.77	350.16	2309.64	5.35 S	5.62 E	-5.25	0.41
2595.00	1.16	39.82	2594.60	1.25 S	7.14 E	-7.04	0.31
2880.00	1.38	314.99	2879.55	3.39 N	6.56 E	-6.77	0.60
3164.00	1.28	212.56	3163.51	3.14 N	2.43 E	-2.63	0.73
3449.00	1.51	159.63	3448.43	3.07 S	2.02 E	-1.82	0.44
3734.00	2.20	179.46	3733.29	12.06 S	3.38 E	-2.58	0.33
4019.00	2.87	201.36	4018.01	24.17 S	0.84 E	0.76	0.41
4304.00	1.87	210.46	4302.77	34.83 S	4.12 W	6.41	0.37
4399.00	1.33	210.20	4397.73	37.12 S	5.46 W	7.90	0.57
4494.00	2.82	176.96	4492.67	40.40 S	5.89 W	8.55	1.95
4589.00	3.93	169.72	4587.50	45.94 S	5.19 W	8.21	1.25
4684.00	5.27	169.66	4682.19	53.44 S	3.82 W	7.35	1.41

4779.00	6.49	164.48	4776.69	62.90 S	1.60 W	5.76	1.40
4874.00	7.61	171.83	4870.97	74.30 S	0.73 E	4.19	1.51
4969.00	8.71	171.35	4965.01	87.64 S	2.70 E	3.10	1.16
5063.00	8.33	171.68	5057.97	101.41 S	4.76 E	1.95	0.41
5158.00	8.91	170.91	5151.90	115.49 S	6.92 E	0.73	0.62
5253.00	9.46	179.33	5245.69	130.56 S	8.17 E	0.48	1.53
5348.00	9.11	175.14	5339.44	145.86 S	8.90 E	0.76	0.80
5443.00	9.44	178.69	5433.20	161.14 S	9.71 E	0.96	0.70
5538.00	10.74	189.81	5526.74	177.66 S	8.38 E	3.38	2.46
5633.00	11.08	191.55	5620.02	195.32 S	5.05 E	7.87	0.50
5728.00	12.11	190.87	5713.08	214.05 S	1.34 E	12.81	1.09
5822.00	12.43	186.21	5804.94	233.79 S	1.61 W	17.06	1.11
5916.00	12.58	187.39	5896.71	254.00 S	4.02 W	20.80	0.32
5942.00	12.38	189.22	5922.09	259.56 S	4.83 W	21.98	1.70
6057.00	14.04	215.62	6034.15	283.09 S	14.94 W	33.62	5.39
6104.00	17.33	217.02	6079.39	293.32 S	22.48 W	41.82	7.05
6152.00	17.37	230.97	6125.23	303.54 S	32.36 W	52.35	8.65
6199.00	18.71	246.37	6169.94	310.99 S	44.72 W	65.18	10.51
6247.00	22.30	253.03	6214.90	316.73 S	60.49 W	81.29	8.91
6294.00	25.75	250.01	6257.82	322.83 S	78.62 W	99.79	7.79
6342.00	29.58	248.14	6300.33	330.81 S	99.42 W	121.07	8.18
6389.00	34.61	247.74	6340.13	340.19 S	122.56 W	144.77	10.71
6437.00	39.99	246.51	6378.30	351.51 S	149.34 W	172.25	11.31
6484.00	45.05	243.79	6412.93	364.88 S	178.13 W	201.86	11.45
6532.00	49.60	244.79	6445.46	380.18 S	209.92 W	234.59	9.60
6579.00	52.90	248.65	6474.88	394.63 S	243.59 W	269.14	9.50
6627.00	55.47	252.02	6502.97	407.71 S	280.24 W	306.57	7.81
6673.00	59.17	253.88	6527.81	419.05 S	317.25 W	344.25	8.73
6721.00	63.76	254.47	6550.73	430.54 S	357.81 W	385.48	9.62
6768.00	67.83	253.99	6570.00	442.19 S	399.05 W	427.41	8.71
6816.00	73.58	254.80	6585.85	454.37 S	442.67 W	471.74	12.08
6863.00	79.32	255.15	6596.86	466.20 S	486.78 W	516.53	12.23
6923.00	86.46	257.31	6604.28	480.36 S	544.57 W	575.13	12.42
6977.00	90.10	263.00	6605.90	489.58 S	597.72 W	628.77	12.50

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 266.21 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 6977.00 FEET
IS 772.63 FEET ALONG 230.68 DEGREES (GRID)

Surface surveys at 304 ft and 612 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 6923 ft MD to TD at 6977 ft MD.

Date Printed:07 September 2013