



1 : 240

[illegible]

## WELL INFORMATION

<b>MWD Run Number</b>	100	200			
<b>Date run completed</b>	22-Nov-12	23-Nov-12			
<b>Rig Bit Number</b>	100	200			
<b>Bit Size (in)</b>	8.750	8.750			
<b>Tool Nominal OD (in)</b>	6.750	6.750			
<b>Log Start Depth (TVD, ft)</b>	790.00	6,228.53			
<b>Log End Depth (TVD, ft)</b>	6,228.53	7,004.54			
<b>Drill or Wipe</b>	Drill	Drill			
<b>Drill/Wipe Start Date and Time</b>	21-Nov-12 07:00	22-Nov-12 15:08			
<b>Drill/Wipe End Date and Time</b>	22-Nov-12 06:30	23-Nov-12 13:13			
<b>Min Inc (deg) @ Depth (TVD, ft)</b>	.04 @ 915.00	1.05 @ 6,260.52			
<b>Max Inc (deg) @ Depth (TVD, ft)</b>	11.58 @ 1,938.09	77.12 @ 6,993.85			
<b>Bit TFA(in2) / Bit Type</b>	.75 / PDC	.86 / PDC			
<b>Flow Rate (gpm)</b>	550.00	590.00			
<b>Max AV (fpm) / CV (fpm) @ MWD</b>	405.9 / 405.9	477.1 / 477.1			
<b>Fluid Type</b>	Fresh Water Gel	Fresh Water Gel			
<b>Density (ppg) / Viscosity (spqt)</b>	8.40 / 27.00	10.20 / 36.00			
<b>Filtrate CL (ppm)</b>	400.00	550.00			
<b>pH / Fluid Loss (mptm)</b>	8.00 / N/A	9.80 / N/A			
<b>PV (cP) / YP (lbf2)</b>	1 / 4.00	10 / 9.00			
<b>% Solids / % Sand</b>	0.5 / 0.05	8.1 / 0.3			
<b>% Oil / Oil:Water Ratio</b>	N/A / N/A	N/A / N/A			
<b>Rm @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A			
<b>Rmf @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A			
<b>Rmc @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A			
<b>Max Tool Temp (deg F) / S</b>	158.18 / PDM	175.21 / PDM			

Max Tool Temp (degF) / Source	150.10 / PCM	175.21 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Robert Ley	Robert Ley			
Customer Representative	Charles Culver	Charles Culver			

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.76	5.76			
Sub Serial Number	11404261	11404261			
Insert Serial Number	11680789	11680740			
Date and Time Initialized	20-Nov-12 10:02	20-Nov-12 12:46			
Date and Time Read	22-Nov-12 13:30	23-Nov-12 18:22			
ECMB SW Version	N/A	N/A			

### Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	56.00	56.00			
Software Version	6.21	6.21			
Sub Serial Number	11404261	11404261			
Sonde Serial Number	10993273	11062120			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	19.64	305.36			

### Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.11	49.01			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404261	11404261			
Insert/Sonde Serial Number	11293393	11680942			

## REMARKS

1. All depths are true vertical depths and are calibrated to the driller' pipe tally and are measured from the 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.
4. The Following smoothing parameters have been applied to the data"

PGRC (Gamma Ray):

Interval Resolution: 0.5 feet

Coercion Distance: 0.6 feet

Gap Fill: 3.0 feet

ROPA (Rate of Penetration):

Interval Resolution: 0.5 feet

Coercion Distance: 1.2 feet

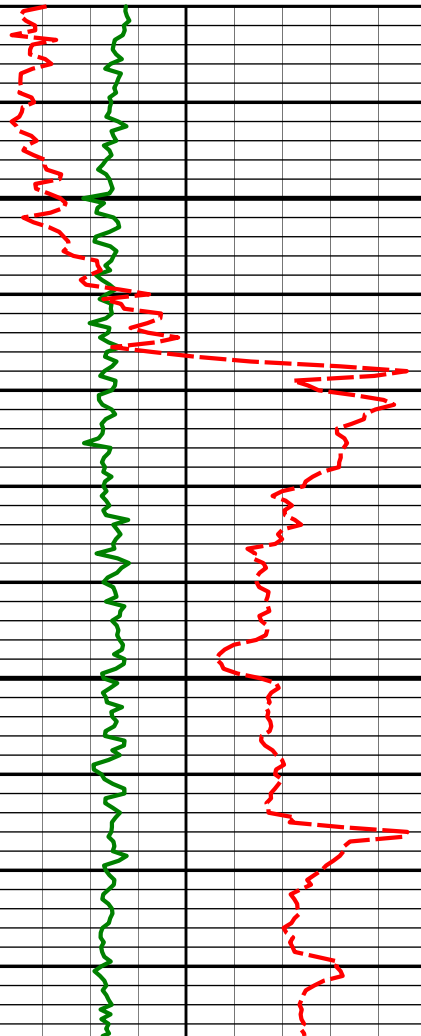
## WARRANTY

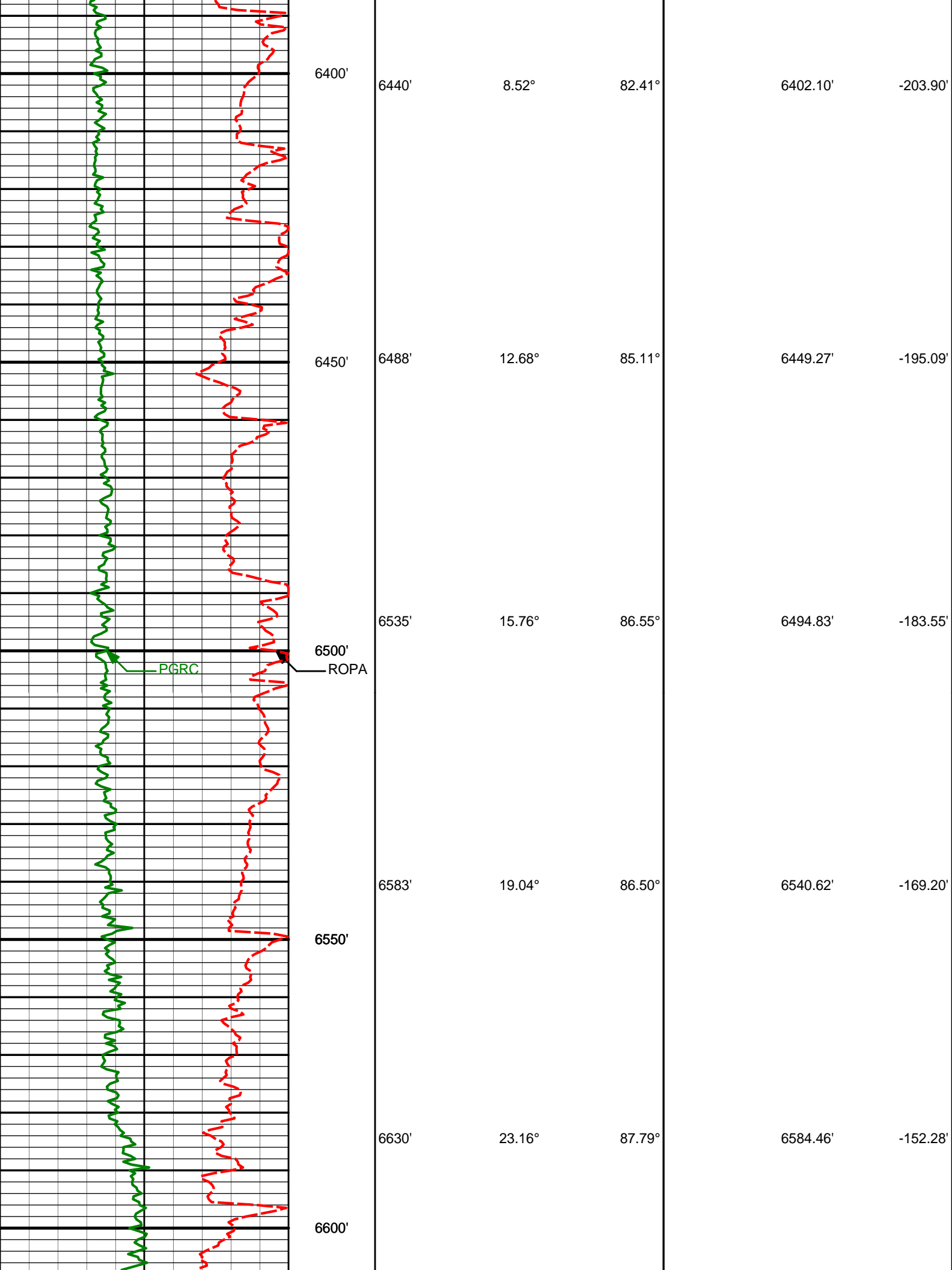
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS

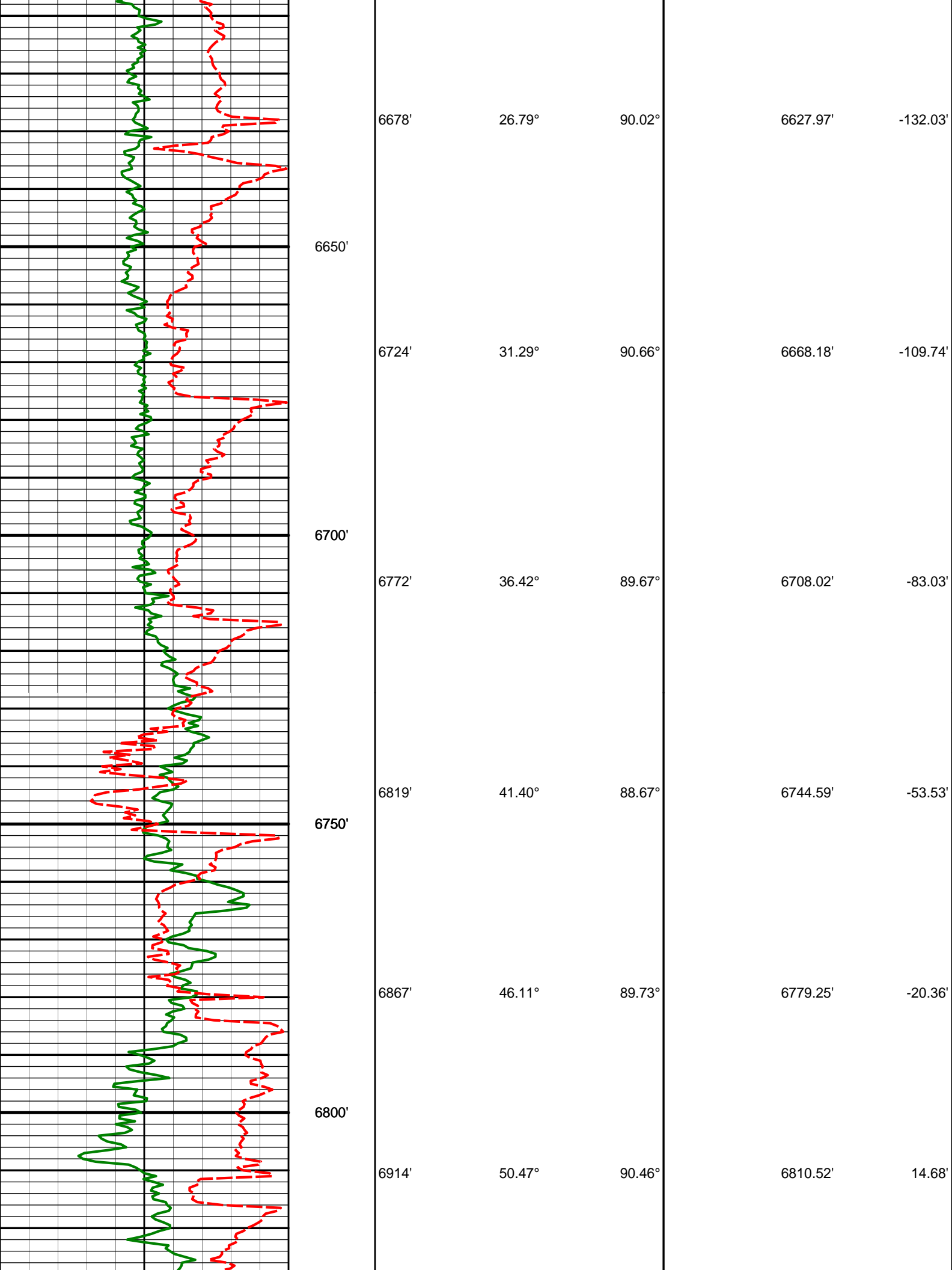
THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY OTHER THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION AND PRODUCTION OPERATION. HALLIBURTON MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HALLIBURTON BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HALLIBURTON.

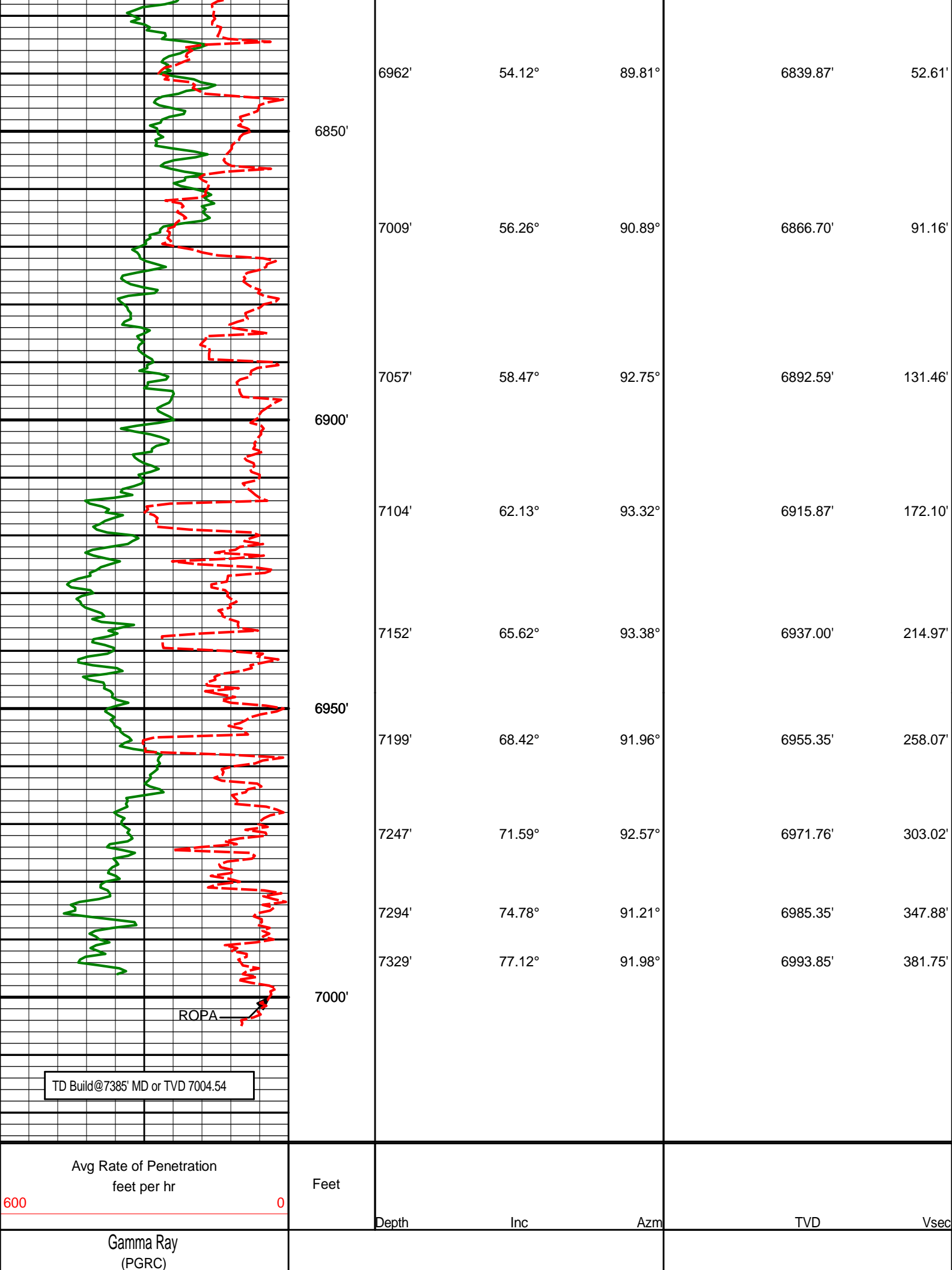
HALLIBURTON

TVD Detail Log 1:240

Gamma Ray (PGRC) (Api)					
0300					
Avg Rate of Penetration feet per hr	Feet				
6000		Depth	Inc	Azm	TVDVsec
	6300'	6345'	1.60°	109.56°	6307.51'-211.89'
	<div>KOP</div>				
	6350'	6393'	4.94°	69.95°	6355.43'-209.30'









# HALLIBURTON

## DIRECTIONAL SURVEY REPORT

Noble Energy  
FiveM E28-69HN  
Wattenberg  
Weld Colorado  
USA  
CA-XX-0009939842

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
790.00	0.00	0.00	790.00	0.00 N	0.00 E	0.00	TIE-IN
915.00	0.04	162.90	915.00	0.05 S	0.01 E	0.01	0.03
1102.00	0.71	110.60	1101.99	0.52 S	1.12 E	1.10	0.37
1195.00	1.07	86.08	1194.98	0.66 S	2.52 E	2.49	0.55
1288.00	1.21	76.14	1287.97	0.37 S	4.34 E	4.32	0.26
1381.00	1.22	105.97	1380.95	0.41 S	6.25 E	6.22	0.67
1474.00	1.43	90.04	1473.92	0.68 S	8.36 E	8.33	0.46
1567.00	2.25	286.68	1566.90	0.16 S	7.77 E	7.76	3.92
1660.00	3.33	328.75	1659.80	2.67 N	4.63 E	4.73	2.41
1753.00	6.45	335.59	1752.45	9.74 N	1.07 E	1.47	3.41
1846.00	8.89	329.59	1844.61	20.69 N	4.73 W	-3.86	2.76
1941.00	11.58	329.92	1938.09	35.28 N	13.22 W	-11.74	2.83
2036.00	10.51	327.30	2031.33	50.82 N	22.69 W	-20.55	1.24
2131.00	9.16	325.42	2124.93	64.34 N	31.66 W	-28.95	1.47
2226.00	9.83	326.75	2218.63	77.34 N	40.39 W	-37.13	0.74
2320.00	10.46	328.34	2311.17	91.31 N	49.27 W	-45.42	0.73
2415.00	9.59	330.23	2404.72	105.51 N	57.72 W	-53.27	0.98
2510.00	10.44	326.59	2498.27	119.56 N	66.39 W	-61.34	1.12
2605.00	9.02	328.01	2591.90	133.06 N	75.07 W	-69.46	1.51
2699.00	10.32	329.29	2684.56	146.55 N	83.28 W	-77.10	1.40
2794.00	11.44	326.00	2777.85	161.68 N	92.89 W	-86.07	1.35
2889.00	11.49	326.11	2870.96	177.35 N	103.44 W	-95.95	0.06
2984.00	10.14	324.42	2964.27	192.00 N	113.58 W	-105.48	1.46
3079.00	11.01	331.14	3057.66	206.75 N	122.83 W	-114.10	1.59
3173.00	9.79	330.06	3150.11	221.54 N	131.15 W	-121.80	1.32
3268.00	9.66	326.09	3243.75	235.16 N	139.63 W	-129.70	0.72
3363.00	9.00	326.81	3337.49	247.99 N	148.14 W	-137.67	0.70
3458.00	10.20	329.96	3431.16	261.50 N	156.42 W	-145.38	1.38
3553.00	10.00	329.46	3524.68	275.89 N	164.83 W	-153.18	0.24
3648.00	8.42	328.60	3618.46	288.92 N	172.64 W	-160.44	1.67
3743.00	9.81	328.46	3712.25	301.76 N	180.50 W	-167.76	1.47
3838.00	10.89	329.63	3805.71	316.40 N	189.27 W	-175.91	1.15
3933.00	10.97	329.15	3898.98	331.90 N	198.44 W	-184.43	0.13
4028.00	9.40	328.07	3992.48	346.25 N	207.18 W	-192.56	1.66
4123.00	6.87	318.66	4086.52	357.10 N	215.04 W	-199.96	3.01
4217.00	4.85	323.91	4180.03	364.54 N	221.10 W	-205.70	2.22
4312.00	2.36	297.51	4274.84	368.69 N	225.20 W	-209.63	3.09
4407.00	1.36	270.62	4369.79	369.60 N	228.06 W	-212.44	1.37
4502.00	1.42	195.35	4464.77	368.48 N	229.49 W	-213.93	1.79
4597.00	1.35	207.61	4559.74	366.36 N	230.32 W	-214.84	0.32
4882.00	0.53	35.53	4844.72	364.46 N	231.11 W	-215.71	0.66
4976.00	0.04	312.96	4938.72	364.83 N	230.88 W	-215.47	0.56
5071.00	0.22	337.20	5033.72	365.03 N	230.98 W	-215.56	0.19
5166.00	0.46	174.28	5128.72	364.82 N	231.01 W	-215.60	0.71
5261.00	0.34	120.17	5223.72	364.29 N	230.73 W	-215.34	0.40
5356.00	0.96	167.84	5318.71	363.37 N	230.32 W	-214.97	0.81
5451.00	1.07	122.57	5413.70	362.12 N	229.40 W	-214.10	0.83
5546.00	0.58	130.69	5508.69	361.32 N	228.29 W	-213.02	0.53
5641.00	0.68	134.51	5603.68	360.61 N	227.52 W	-212.29	0.12
5735.00	0.54	105.39	5697.68	360.10 N	226.70 W	-211.48	0.36
5830.00	0.72	106.86	5792.67	359.81 N	225.70 W	-210.50	0.19
5925.00	0.85	132.88	5887.66	359.16 N	224.61 W	-209.44	0.39
6020.00	1.03	165.81	5982.65	357.86 N	223.89 W	-208.77	0.59
6115.00	1.38	201.88	6077.63	355.97 N	221.10 W	-209.06	0.86

6115.00	1.38	201.88	6077.85	353.97 N	224.16 W	-209.88	0.88
6210.00	2.81	229.23	6172.57	353.39 N	226.29 W	-211.36	1.80
6298.00	1.05	151.32	6260.52	351.28 N	227.54 W	-212.69	3.16
6345.00	1.60	109.56	6307.51	350.68 N	226.71 W	-211.89	2.28
6393.00	4.94	69.95	6355.43	351.17 N	224.14 W	-209.30	8.02
6440.00	8.52	82.41	6402.10	352.32 N	218.78 W	-203.90	8.18
6488.00	12.68	85.11	6449.27	353.24 N	210.00 W	-195.09	8.71
6535.00	15.76	86.55	6494.83	354.06 N	198.49 W	-183.55	6.61
6583.00	19.04	86.50	6540.62	354.93 N	184.16 W	-169.20	6.83
6630.00	23.16	87.79	6584.46	355.76 N	167.27 W	-152.28	8.80
6678.00	26.79	90.02	6627.97	356.12 N	147.01 W	-132.03	7.82
6724.00	31.29	90.66	6668.18	355.98 N	124.69 W	-109.74	9.81
6772.00	36.42	89.67	6708.02	355.92 N	97.96 W	-83.03	10.75
6819.00	41.40	88.67	6744.59	356.36 N	68.45 W	-53.53	10.67
6867.00	46.11	89.73	6779.25	356.81 N	35.27 W	-20.36	9.93
6914.00	50.47	90.46	6810.52	356.75 N	0.20 W	14.68	9.35
6962.00	54.12	89.81	6839.87	356.66 N	37.77 E	52.61	7.69
7009.00	56.26	90.89	6866.70	356.42 N	76.36 E	91.16	4.92
7057.00	58.47	92.75	6892.59	355.13 N	116.75 E	131.46	5.64
7104.00	62.13	93.32	6915.87	352.96 N	157.52 E	172.10	7.87
7152.00	65.62	93.38	6937.00	350.45 N	200.53 E	214.97	7.26
7199.00	68.42	91.96	6955.35	348.44 N	243.75 E	258.07	6.57
7247.00	71.59	92.57	6971.76	346.65 N	288.81 E	303.02	6.71
7294.00	74.78	91.21	6985.35	345.17 N	333.77 E	347.88	7.33
7329.00	77.12	91.98	6993.85	344.23 N	367.71 E	381.75	7.02

**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 46.89 DEGREES (GRID)  
A TOTAL CORRECTION OF 8.14 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 7329.00 FEET  
IS 503.69 FEET ALONG 46.89 DEGREES (GRID)**