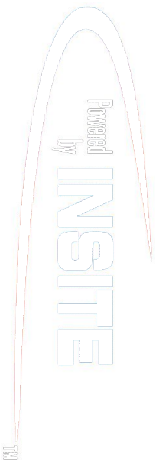


PCGK: Pressure Case Gamma

PCDC: Pressure Case Directional



Country : USA				
Field : Weld				
Location : Lat: 40° 46' 29.89" North Long: 103° 51' 40.46" West				
Well : Rohn State LD10-69HN				
Company : Noble Energy				
Rig : H & P 273				
LOCATION				
Latitude : 40° 46' 29.89" North Longitude : 103° 51' 40.46" West		Other Services		
UTM Easting = 3,453,861.220 ft UTM Northing = 1,529,361.300 ft		Directional Drilling		
Permanent Datum : Ground Level		Elev. KB N/A		
Log Measured From : Drill Floor		DF 4731.00 ft GL 4707.00 ft WD N/A		
Drilling Measured From : Drill Floor		TVD LOG		
Depth Logged : 1,211.98 ft To 5,760.93 ft		Unit No. : 11703717		
Date Logged : 28-Sep-14 To 30-Sep-14		Job No. : CA-XX-0901698595		
Total Depth MD : 6,189.00 ft TVD: 5,760.93 ft		Plot Type : Final		
Spud Date : 27-Sep-14		Plot Date : 01-Oct-14		
Run No.	Borehole Record (TVD)		Borehole Record (TVD)	
	Size	From	To	Run No.
2	8.750 in	1,211.98 ft	4,980.74 ft	Size
	8.750 in	4,980.74 ft	5,760.93 ft	Weight
3			Casing Record (TVD)	
	Size	From	To	Weight
		7.000 in	26.00 lbpf	SURFACE
				</

WELL INFORMATION				
MWD Run Number	100	200		
Date run completed	29-Sep-14	30-Sep-14		
Rig Bit Number	2	3		
Bit Size (in)	8.750	8.750		
Tool Nominal OD (in)	6.830	6.750		
Log Start Depth (TVD, ft)	1,211.98	4,980.74		
Log End Depth (TVD, ft)	4,980.74	5,760.93		
Drill or Wipe	Drill	Drill		
Drill/Wipe Start Date and Time	28-Sep-14 19:15	29-Sep-14 23:00		
Drill/Wipe End Date and Time	29-Sep-14 05:50	30-Sep-14 09:50		
Min Inc (deg) @ Depth (TVD, ft)	0.43 @ 1,269.98	0.34 @ 5,027.74		
Max Inc (deg) @ Depth (TVD, ft)	14.45 @ 3,485.02	85.00 @ 5,760.93		
Bit TFA(in2) / Bit Type	0.74 / PDC	0.91 / PDC		
Flow Rate (gpm)	583.17	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)	9.60 / 31.00	10.60 / 43.00		
Filtrate CL (ppm)	200.00	150.00		
pH / Fluid Loss (mptm)	9.10 / 0	9.50 / 0		
PV (cP) / YP (lhf2)	3 / 5.00	16 / 10.00		
% Solids / % Sand	.2 / .2	11 / .15		
% 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		
M T 1000	150.45 / 0.01	120.20 / 0.01		

Max Tool Temp (degF) / Source	150.10 / PCM	162.80 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Juan Pablo Centeno	Juan Pablo Centeno			
Customer Representative	Justin Fields	Justin Fields			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11404274	11404274			
Insert Serial Number	11400845	11400845			
Date and Time Initialized	26-Sep-14 15:32	29-Sep-14 16:38			
Date and Time Read	29-Sep-14 15:43	30-Sep-14 15:56			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	53.00	52.26			
Software Version	6.21	6.21			
Sub Serial Number	11404274	11404274			
Sonde Serial Number	11297588	11297588			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	50.60	313.74			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	47.90	47.16			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404274	11404274			
Insert/Sonde Serial Number	11680972	11680972			

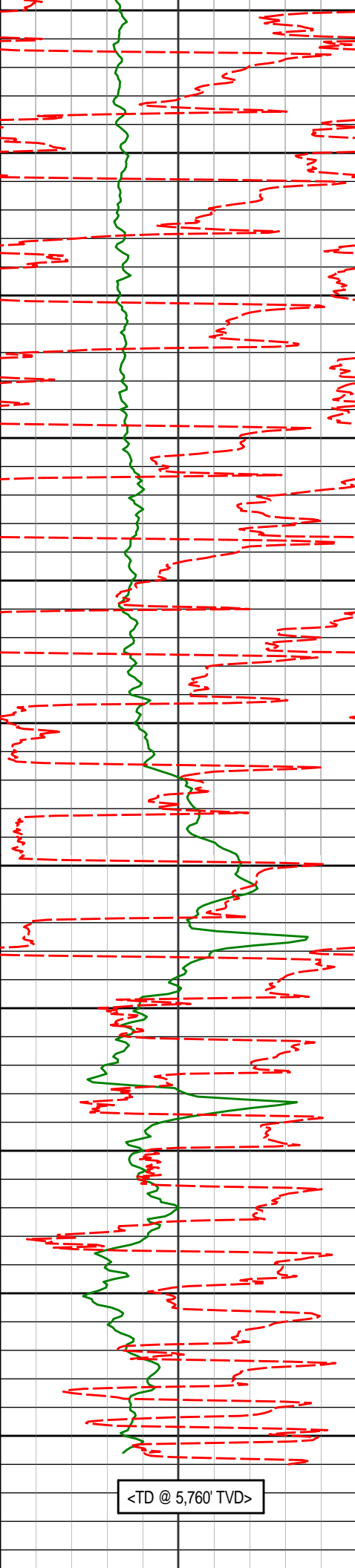
REMARKS

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:
 - 2" (1:600) log - 1 ft. interval, 3 ft. coercion distance, 5 ft. gap fill.
 - 5" (1:240) log for ROP - 0.5 ft. interval, 1.2 ft. coercion distance, 3 ft. gap fill.
 - 5" (1:240) log for Gamma Ray - 0.5 ft. interval, 0.6 ft. coercion distance, 3 ft. gap fill.
5. INSITE version 8.0.20

WARRANTY

HALLIBURTON
Sperry Drilling Services
TVD Detail Log 1:600

PCG Gamma Ray PGRC							
0 300 api							
Avg Rate of Penetration ROPA		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
500 0 feet per hr							
		4950					
		<Run 200>	5049'	0.83°	162.44°	4979.74'	213.16'
		5000					
		5097'	0.34°	177.82°	5027.74'	213.32'	
		<KOP> 5050					
		5144'	3.56°	103.40°	5074.71'	214.78'	
		5100					
		5192'	9.07°	100.69°	5122.40'	220.04'	
		5150					
		5238'	10.22°	96.31°	5167.75'	227.74'	
		5200					
		5286'	12.60°	89.38°	5214.80'	237.19'	



5250

5333'

17.11°

84.88°

5260.21'

249.07'

5300

5381'

21.35°

87.08°

5305.53'

264.63'

5350

5428'

25.10°

87.57°

5348.71'

282.94'

5400

5476'

27.15°

86.74°

5391.81'

303.81'

5450

5523'

30.81°

87.72°

5432.91'

326.30'

5500

5571'

36.44°

90.69°

5472.87'

352.68'

5550

5618'

39.44°

90.92°

5509.93'

381.44'

5600

5666'

43.90°

89.25°

5545.78'

413.16'

5650

5712'

48.93°

88.88°

5577.48'

446.21'

5700

5760'

52.85°

89.66°

5607.76'

483.18'

5750

5807'

56.08°

89.91°

5635.07'

521.18'

5855'

58.98°

89.97°

5660.84'

561.43'

5902'

62.81°

90.40°

5683.70'

602.26'

5997'

70.36°

90.21°

5722.22'

688.58'

6045'

74.65°

88.94°

5736.65'

734.04'

6092'

79.27°

88.53°

5747.25'

779.43'

6135'

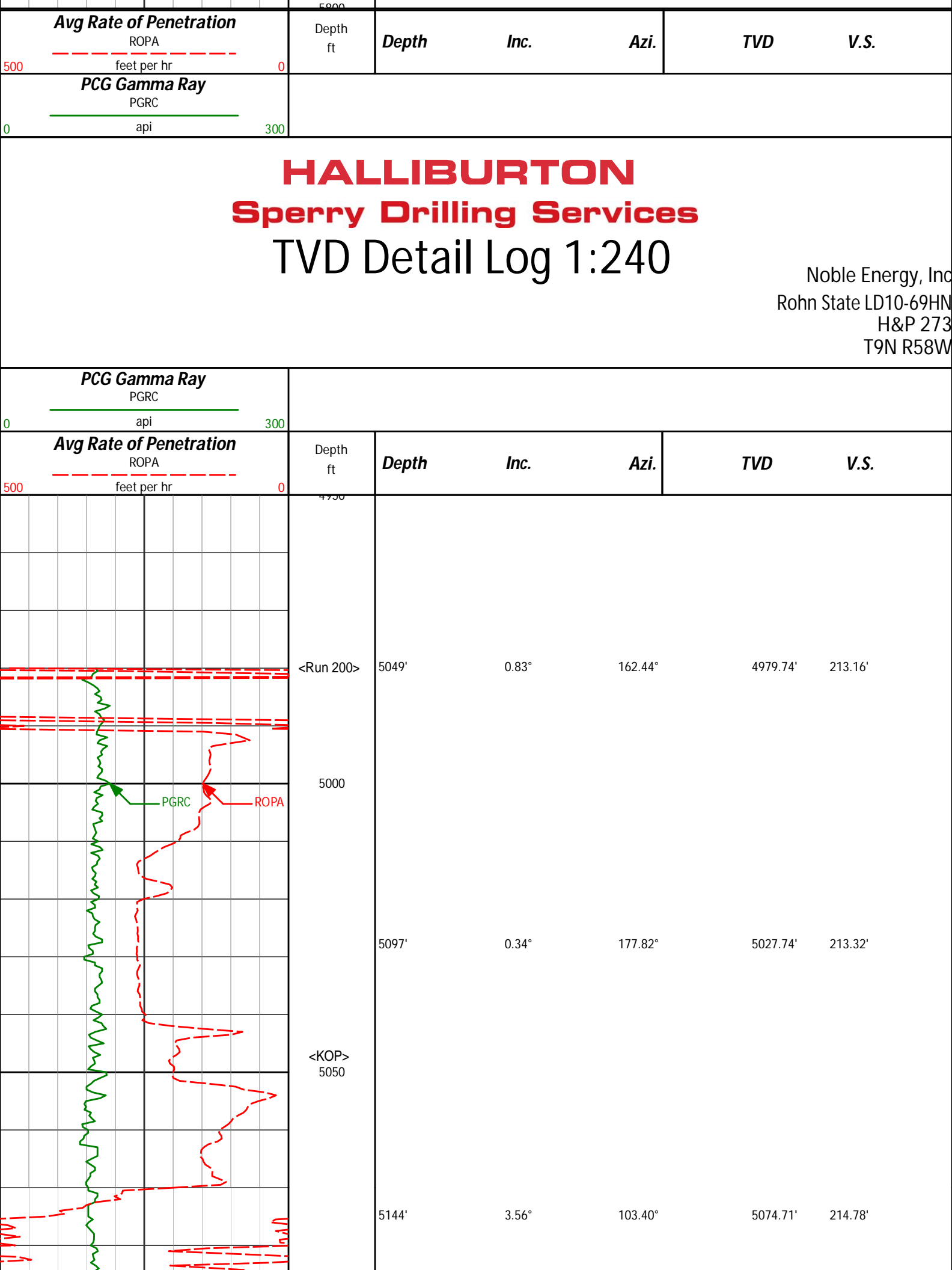
81.59°

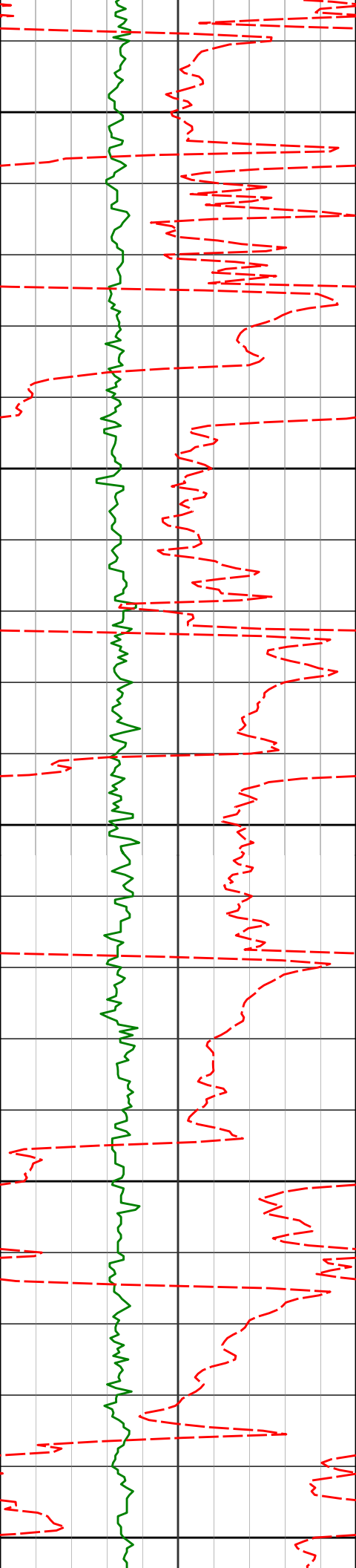
90.51°

5754.40'

821.54'

<TD @ 5,760' TVD>





5100

5192'

9.07°

100.69°

5122.40'

220.04'

5150

5238'

10.22°

96.31°

5167.75'

227.74'

5200

5286'

12.60°

89.38°

5214.80'

237.19'

5250

5333'

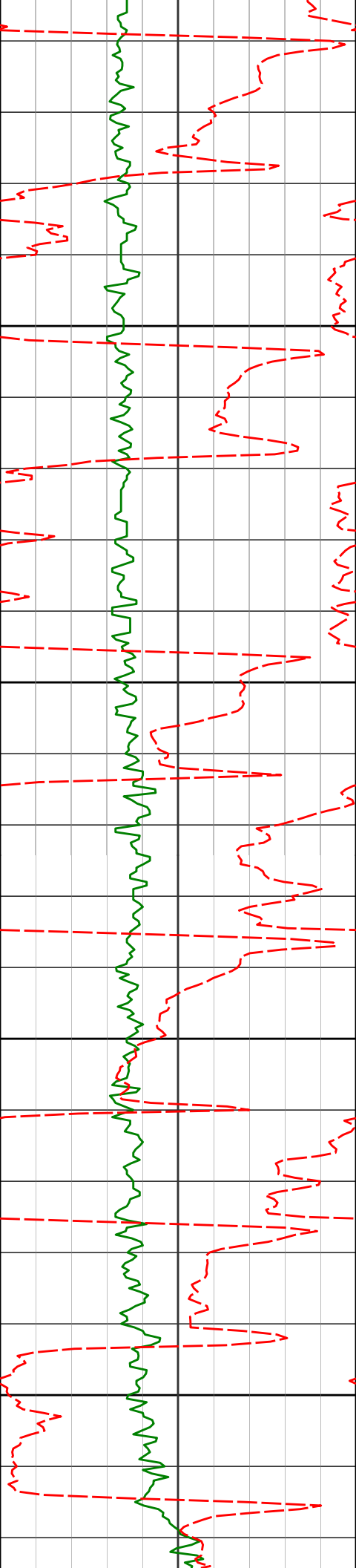
17.11°

84.88°

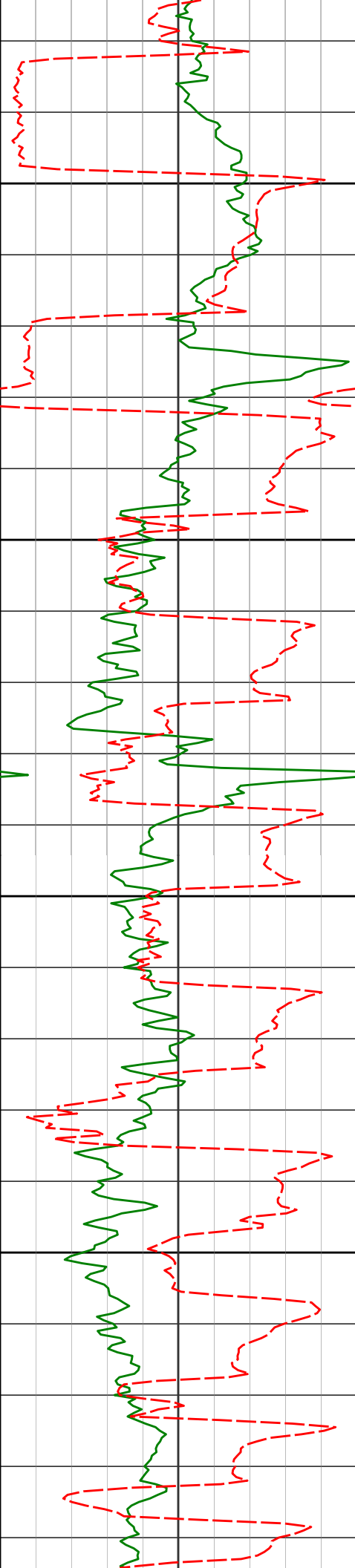
5260.21'

249.07'

5300



	5381'	21.35°	87.08°	5305.53'	264.63'
5350	5428'	25.10°	87.57°	5348.71'	282.94'
	5476'	27.15°	86.74°	5391.81'	303.81'
5400					
	5523'	30.81°	87.72°	5432.91'	326.30'
5450					
	5571'	36.44°	90.69°	5472.87'	352.68'
5500					
	5618'	39.44°	90.92°	5509.93'	381.44'



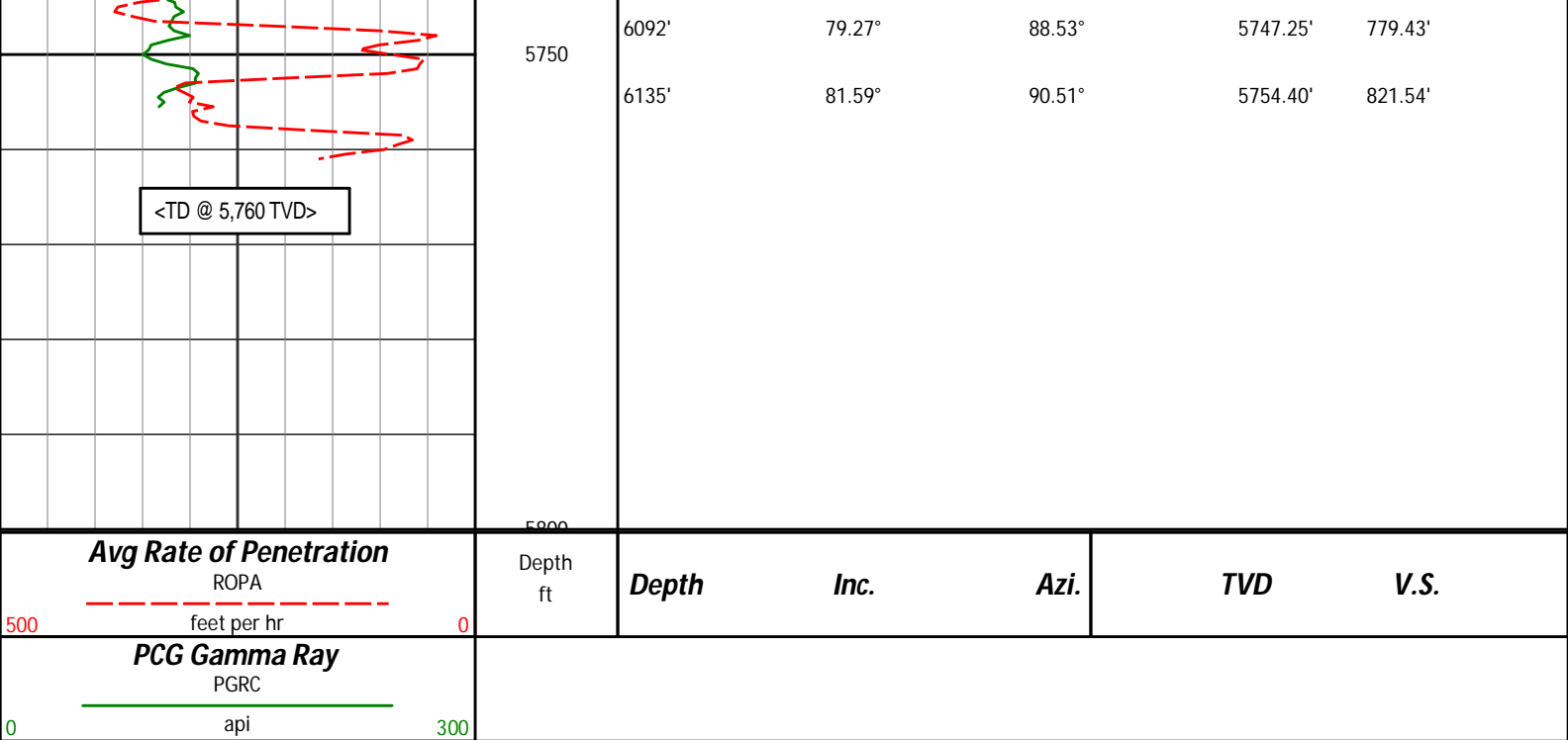
5550

5600

5650

5700

5666'	43.90°	89.25°	5545.78'	413.16'
5712'	48.93°	88.88°	5577.48'	446.21'
5760'	52.85°	89.66°	5607.76'	483.18'
5807'	56.08°	89.91°	5635.07'	521.18'
5855'	58.98°	89.97°	5660.84'	561.43'
5902'	62.81°	90.40°	5683.70'	602.26'
5997'	70.36°	90.21°	5722.22'	688.58'
6045'	74.65°	88.94°	5736.65'	734.04'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Rohn State LD10-69HN
Weld
Weld Colorado
USA
CA-XX-0901698595

Surveys from 5997 ft MD to 6135 ft MD are IFR1 and MSA corrected.

<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>
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
340.00	0.30	333.58	340.00	0.80 N	0.40 W	-0.48	0.09
830.00	0.40	335.98	829.99	3.51 N	1.66 W	-2.03	0.02
1200.00	0.40	335.98	1199.98	5.87 N	2.71 W	-3.33	0.00
1270.00	0.43	204.34	1269.98	5.85 N	2.92 W	-3.54	1.08
1363.00	3.23	178.73	1362.92	2.92 N	3.01 W	-3.30	3.06
1455.00	6.31	170.19	1454.59	4.66 S	2.09 W	-1.57	3.43
1547.00	8.45	171.83	1545.83	16.33 S	0.26 W	1.50	2.34
1640.00	9.85	166.17	1637.64	30.82 S	2.61 E	5.92	1.78
1733.00	10.80	166.90	1729.14	47.03 S	6.48 E	11.52	1.04
1828.00	12.82	168.71	1822.12	66.05 S	10.57 E	17.63	2.16
1922.00	12.85	167.65	1913.77	86.49 S	14.85 E	24.08	0.25
2017.00	13.12	165.02	2006.34	107.23 S	19.89 E	31.34	0.68
2112.00	12.96	164.24	2098.89	127.90 S	25.57 E	39.22	0.25
2206.00	12.57	163.80	2190.57	147.87 S	31.29 E	47.05	0.42
2301.00	12.72	172.21	2283.27	168.16 S	35.59 E	53.52	1.94
2491.00	12.62	172.30	2468.65	209.44 S	41.21 E	63.55	0.05
2586.00	12.74	172.39	2561.33	230.10 S	43.98 E	68.54	0.13
2680.00	12.95	171.41	2652.98	250.79 S	46.93 E	73.69	0.32
2775.00	12.65	171.24	2745.62	271.59 S	50.10 E	79.09	0.32
2870.00	12.42	171.69	2838.35	291.98 S	53.16 E	84.34	0.26
2965.00	12.22	165.94	2931.17	311.84 S	57.08 E	90.37	1.31
3059.00	11.63	166.28	3023.14	330.70 S	61.75 E	97.05	0.63
3154.00	13.18	166.94	3115.92	350.56 S	66.47 E	103.88	1.64
3344.00	13.74	165.79	3300.70	393.54 S	76.91 E	118.89	0.32
3438.00	13.98	165.14	3391.96	415.34 S	82.56 E	126.86	0.31
3534.00	14.45	165.95	3485.02	438.17 S	88.44 E	135.17	0.53
3628.00	12.87	164.10	3576.36	459.62 S	94.16 E	143.17	1.74
3723.00	11.95	164.15	3669.14	479.26 S	99.74 E	150.84	0.97

3818.00	11.30	165.34	3762.19	497.73 S	104.78 E	157.84	0.74
3913.00	12.04	167.96	3855.22	516.41 S	109.20 E	164.25	0.96
4008.00	12.15	168.12	3948.12	535.88 S	113.33 E	170.45	0.13
4103.00	11.87	169.01	4041.04	555.26 S	117.25 E	176.44	0.35
4197.00	11.53	169.41	4133.08	573.99 S	120.82 E	182.00	0.37
4292.00	10.66	163.91	4226.31	591.77 S	125.00 E	188.08	1.45
4387.00	8.83	160.03	4319.93	607.07 S	129.93 E	194.63	2.04
4482.00	7.57	159.68	4413.96	619.80 S	134.59 E	200.64	1.33
4577.00	5.97	163.27	4508.29	630.41 S	138.19 E	205.36	1.74
4672.00	3.93	158.53	4602.93	638.17 S	140.80 E	208.79	2.20
4766.00	2.00	155.58	4696.80	642.66 S	142.66 E	211.12	2.05
4861.00	1.18	166.48	4791.77	645.13 S	143.57 E	212.30	0.92
4956.00	0.92	176.41	4886.75	646.84 S	143.85 E	212.76	0.33
5049.00	0.83	162.44	4979.74	648.23 S	144.10 E	213.16	0.25
5097.00	0.34	177.82	5027.74	648.71 S	144.21 E	213.32	1.06
5144.00	3.56	103.40	5074.71	649.18 S	145.63 E	214.78	7.41
5192.00	9.07	100.69	5122.40	650.23 S	150.81 E	220.04	11.50
5238.00	10.22	96.31	5167.75	651.35 S	158.43 E	227.74	2.96
5286.00	12.60	89.38	5214.80	651.77 S	167.90 E	237.19	5.71
5333.00	17.11	84.88	5260.21	651.09 S	179.92 E	249.07	9.90
5381.00	21.35	87.08	5305.53	650.02 S	195.68 E	264.63	8.95
5428.00	25.10	87.57	5348.71	649.16 S	214.19 E	282.94	8.00
5476.00	27.15	86.74	5391.81	648.10 S	235.30 E	303.81	4.33
5523.00	30.81	87.72	5432.91	647.01 S	258.04 E	326.30	7.86
5571.00	36.44	90.69	5472.87	646.70 S	284.61 E	352.68	12.21
5618.00	39.44	90.92	5509.93	647.10 S	313.50 E	381.44	6.38
5666.00	43.90	89.25	5545.78	647.13 S	345.40 E	413.16	9.58
5712.00	48.93	88.88	5577.48	646.58 S	378.70 E	446.21	10.95
5760.00	52.85	89.66	5607.76	646.12 S	415.93 E	483.18	8.27
5807.00	56.08	89.91	5635.07	645.98 S	454.17 E	521.18	6.89
5855.00	58.98	89.97	5660.84	645.93 S	494.66 E	561.43	6.05
5902.00	62.81	90.40	5683.70	646.07 S	535.72 E	602.26	8.19
5950.00	65.57	90.44	5704.59	646.39 S	578.93 E	645.25	5.74
5997.00	70.36	90.21	5722.22	646.63 S	622.48 E	688.58	10.21
6045.00	74.65	88.94	5736.65	646.29 S	668.25 E	734.04	9.29
6092.00	79.27	88.53	5747.25	645.28 S	714.01 E	779.43	9.87
6135.00	81.59	90.51	5754.40	644.92 S	756.41 E	821.54	7.05

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 96.19 DEGREES (GRID)
A TOTAL CORRECTION OF 6.98 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6135.00 FEET
IS 994.02 FEET ALONG 130.45 DEGREES (GRID)**

Surface surveys at 340 ft. 830 ft, and 1200 ft have had azimuths corrected to grid north, but were not taken by Halliburton.