

PCGK: Pressure Case Gamma
PCDC: Pressure Case Directional


Country		: USA			
Field		: Wattenberg			
Location		: Lat: 40° 46' 30.65" North Long: 103° 51' 40.46" West			
Well		: Rohn State LD03-62HN			
Company		: Noble Energy			
Rig		: H&P 273			
LOCATION		Latitude : 40° 46' 30.65" North Longitude : 103° 51' 40.46" West UTM Easting = 3,453,859,810 ft UTM Northing = 1,529,437,800 ft		Other Services Directional Drilling	

Permanent Datum		: Ground Level		Elevation : 4706.00 ft		Elev.		KB N/A	
Log Measured From		: Drill Floor		24.00 ft Above Permanent Datum				DF 4730.00 ft GL 4706.00 ft WD N/A	
Drilling Measured From		: Drill Floor		TVD LOG					

Depth Logged		: 1,227.86 ft To 5,629.93 ft		Unit No. : 11703717		Job No. :CA-XX-0901663416	
Date Logged		: 15-Sep-14 To 16-Sep-14		Plot Type : Final			
Total Depth MD		: 5,995.00 ft TVD : 5,629.93 ft		Plot Date : 18-Sep-14			
Spud Date		: 14-Sep-14					

Run No.	Borehole Record (TVD)			Run No.	Borehole Record (TVD)		
	Size	From	To		Size	From	To
2	8.750 in	1,227.86 ft	5,629.93 ft				

Max Tool Temp (degF) / Source	154.30 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ N/A				
Lead MWD Engineer	JP Centeno				
Customer Representative	Dave Nielsen				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.93				
Sub Serial Number	11404274				
Insert Serial Number	11400845				
Date and Time Initialized	15-Sep-14 11:40				
Date and Time Read	17-Sep-14 19:29				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	50.99				
Software Version	6.21				
Sub Serial Number	11404274				
Sonde Serial Number	11297588				
Sensor ID Number	N/A				
Toolface Offset (deg)	67.98				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	45.89				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11404274				
Insert/Sonde Serial Number	11680972				

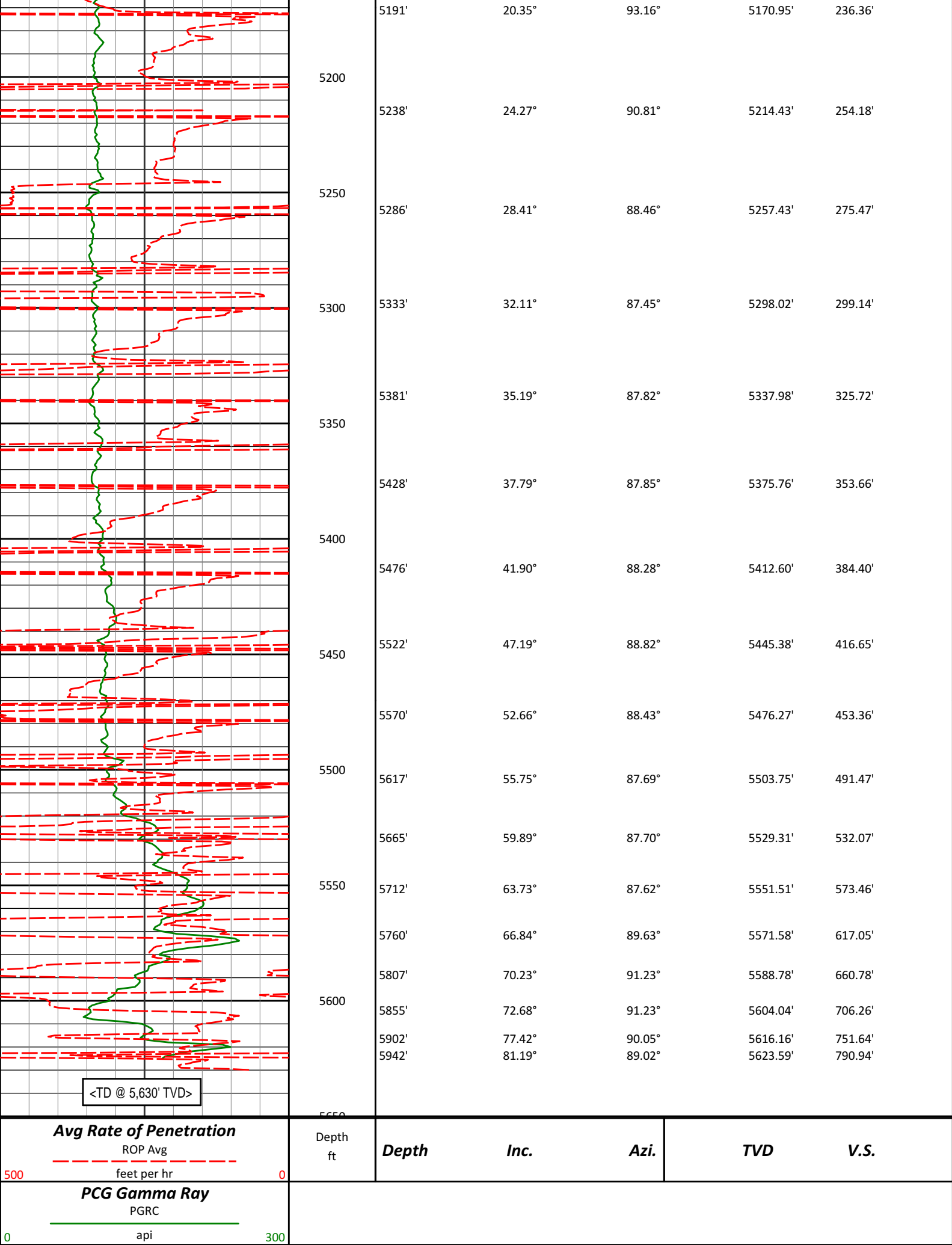
REMARKS

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 api 300		Depth ft	<i>Depth</i>	<i>Inc.</i>	<i>Azi.</i>	<i>TVD</i>	<i>V.S.</i>
Avg Rate of Penetration ROP Avg feet per hr		<KOP>					
		4900	4907'	2.01°	90.57°	4894.57'	176.82'
		4950	4953'	5.40°	96.30°	4940.47'	179.78'
		5000	5001'	9.87°	97.43°	4988.03'	186.09'
		5050	5048'	12.87°	94.17°	5034.10'	195.30'
		5100	5096'	15.81°	93.43°	5080.60'	207.15'
		5150	5143'	17.81°	93.71°	5125.59'	220.71'



<TD @ 5,630' TVD>

Avg Rate of Penetration

ROP Avg

feet per hr

PCG Gamma Ray

PGRC

api

Depth
ft

Depth

Inc.

Azi.

TVD

V.S.

HALLIBURTON

Sperry Drilling Services

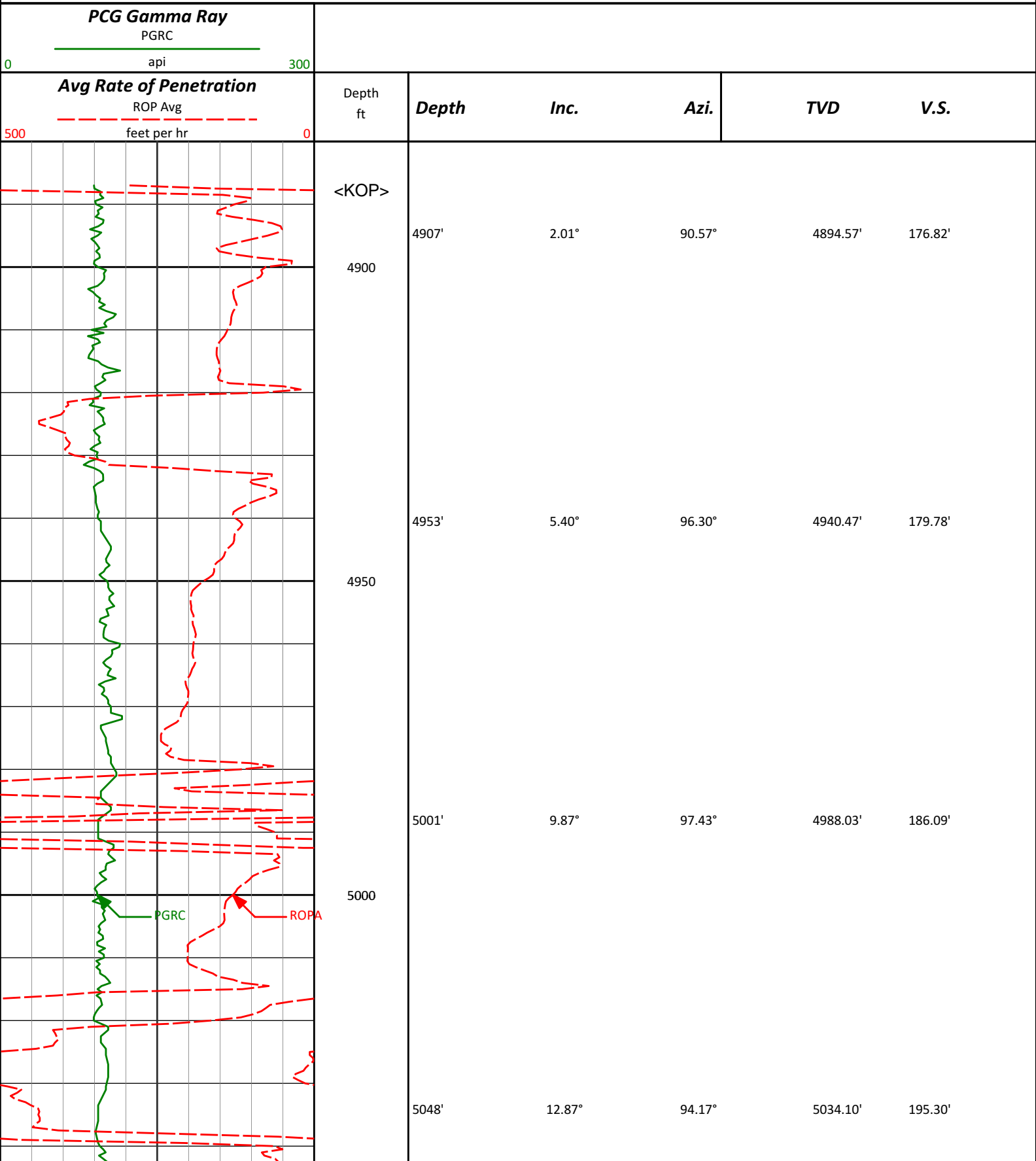
TVD Detail Log 1:240

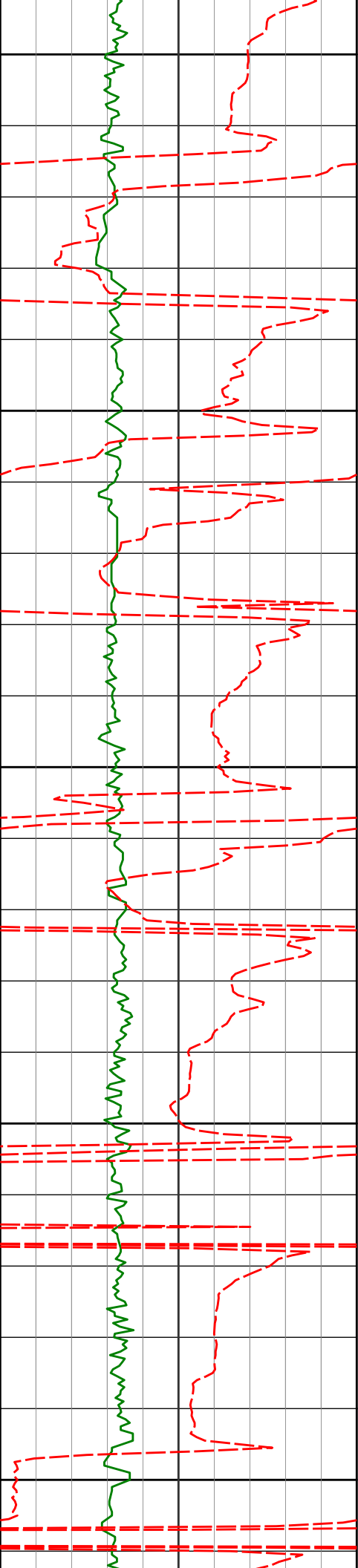
Noble Energy, Inc

Rohn State LD03-62HN

H&P 273

T9N R58W





5050

5096'

15.81°

93.43°

5080.60'

207.15'

5100

5143'

17.81°

93.71°

5125.59'

220.71'

5150

5191'

20.35°

93.16°

5170.95'

236.36'

5200

5238'

24.27°

90.81°

5214.43'

254.18'

5250

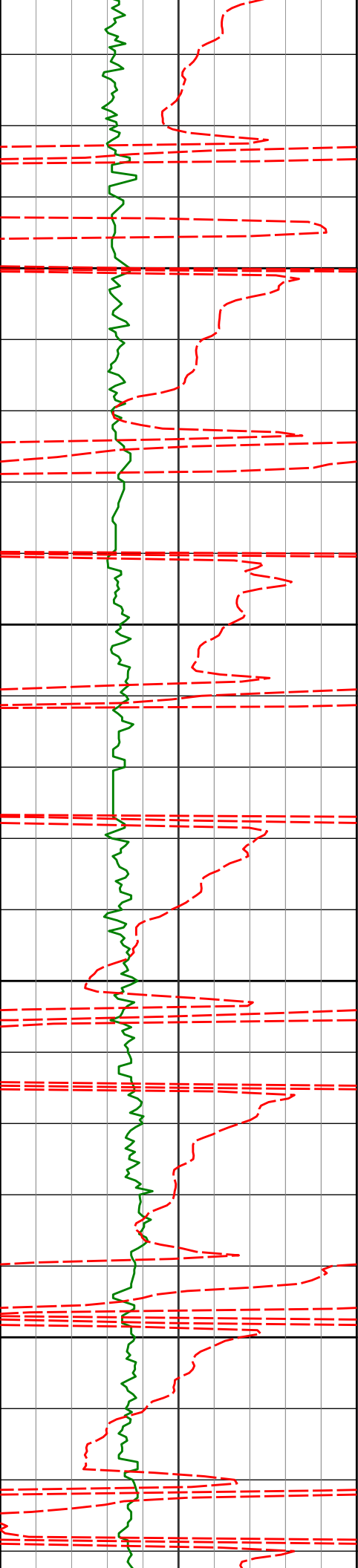
5286'

28.41°

88.46°

5257.43'

275.47'



5300

5333'

32.11°

87.45°

5298.02'

299.14'

5350

5381'

35.19°

87.82°

5337.98'

325.72'

5400

5428'

37.79°

87.85°

5375.76'

353.66'

5450

5522'

47.19°

88.82°

5445.38'

416.65'

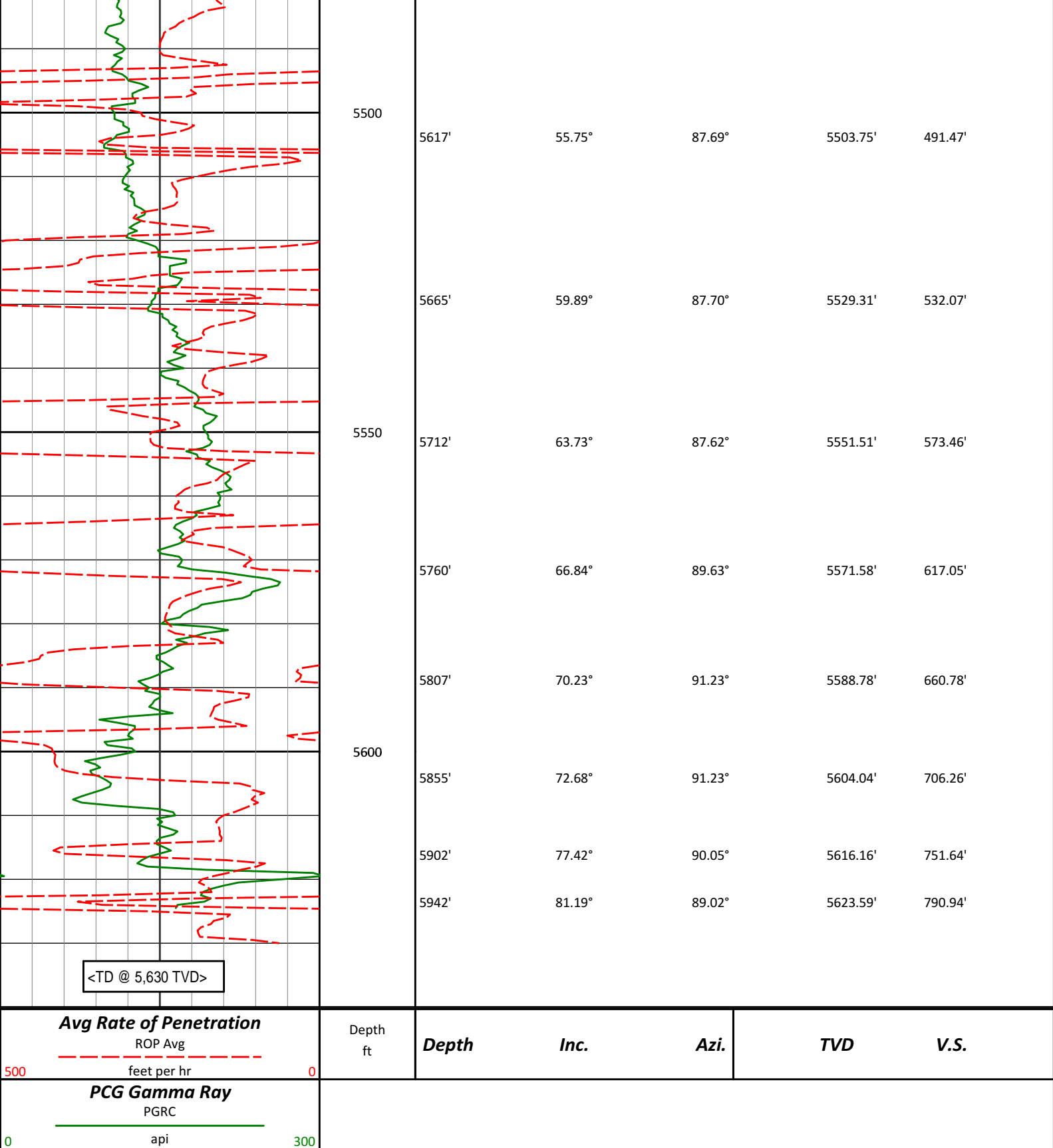
5570'

52.66°

88.43°

5476.27'

453.36'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

**Noble Energy
Rohn State LD03-62HN
Wattenberg
Weld Colorado
USA
CA-XY-0001662416**

<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
450.00	1.20	254.23	449.97	1.28 S	4.53 W	-4.55	0.27
850.00	0.50	248.38	849.92	3.06 S	10.19 W	-10.22	0.18
1200.00	1.79	89.38	1199.87	3.57 S	6.14 W	-6.17	0.65
1488.00	1.27	290.96	1487.83	2.38 S	4.62 W	-4.64	1.04
1566.00	1.12	289.82	1565.82	1.81 S	6.15 W	-6.16	0.19
1752.00	1.31	279.34	1751.78	0.85 S	9.95 W	-9.96	0.16
1845.00	2.74	162.34	1844.74	2.80 S	10.33 W	-10.35	3.80
1938.00	4.33	147.14	1937.56	7.87 S	7.75 W	-7.82	1.97
2030.00	6.28	132.86	2029.17	14.21 S	2.17 W	-2.30	2.55
2122.00	8.39	119.78	2120.42	20.97 S	7.34 E	7.15	2.91
2215.00	8.02	119.59	2212.46	27.54 S	18.87 E	18.62	0.40
2309.00	8.05	116.20	2305.54	33.68 S	30.48 E	30.17	0.51
2402.00	7.99	115.84	2397.63	39.38 S	42.14 E	41.78	0.09
2495.00	8.21	114.66	2489.70	44.96 S	53.99 E	53.58	0.30
2679.00	7.97	112.53	2671.87	55.33 S	77.72 E	77.21	0.21
2774.00	7.64	111.30	2765.99	60.15 S	89.69 E	89.14	0.39
2868.00	7.26	109.31	2859.20	64.39 S	101.12 E	100.53	0.49
2963.00	6.34	105.24	2953.53	67.75 S	111.84 E	111.22	1.09
3058.00	6.06	101.40	3047.97	70.12 S	121.81 E	121.17	0.53
3152.00	6.31	102.68	3141.43	72.23 S	131.71 E	131.05	0.31
3247.00	6.53	104.93	3235.83	74.77 S	142.02 E	141.34	0.35
3437.00	4.37	97.59	3424.97	78.51 S	159.63 E	158.91	1.19
3532.00	2.87	75.10	3519.78	78.37 S	165.51 E	164.80	2.14
3626.00	1.89	8.78	3613.71	76.23 S	168.03 E	167.33	2.90
3910.00	0.44	289.93	3897.65	71.23 S	167.71 E	167.06	0.65
4195.00	1.14	125.36	4182.64	72.49 S	168.98 E	168.32	0.55
4384.00	0.18	287.12	4371.63	73.49 S	170.23 E	169.55	0.69
4479.00	0.91	99.59	4466.63	73.57 S	170.83 E	170.15	1.15
4764.00	0.84	82.62	4751.59	73.68 S	175.13 E	174.46	0.09
4859.00	0.66	90.30	4846.58	73.59 S	176.37 E	175.70	0.21
4907.00	2.01	90.57	4894.57	73.60 S	177.49 E	176.82	2.81
4953.00	5.40	96.30	4940.47	73.85 S	180.45 E	179.78	7.40
5001.00	9.87	97.43	4988.03	74.63 S	186.78 E	186.09	9.31
5048.00	12.87	94.17	5034.10	75.53 S	195.99 E	195.30	6.54
5096.00	15.81	93.43	5080.60	76.31 S	207.85 E	207.15	6.12
5143.00	17.81	93.71	5125.59	77.16 S	221.42 E	220.71	4.27
5191.00	20.35	93.16	5170.95	78.09 S	237.08 E	236.36	5.31
5238.00	24.27	90.81	5214.43	78.68 S	254.91 E	254.18	8.55
5286.00	28.41	88.46	5257.43	78.51 S	276.19 E	275.47	8.89
5333.00	32.11	87.45	5298.02	77.65 S	299.86 E	299.14	7.95
5381.00	35.19	87.82	5337.98	76.56 S	326.43 E	325.72	6.44
5428.00	37.79	87.85	5375.76	75.50 S	354.36 E	353.66	5.53
5476.00	41.90	88.28	5412.60	74.47 S	385.09 E	384.40	8.57
5522.00	47.19	88.82	5445.38	73.66 S	417.34 E	416.65	11.53
5570.00	52.66	88.43	5476.27	72.77 S	454.04 E	453.36	11.43
5617.00	55.75	87.69	5503.75	71.48 S	492.14 E	491.47	6.68
5665.00	59.89	87.78	5529.31	69.88 S	532.72 E	532.07	8.63
5712.00	63.73	87.48	5551.51	68.16 S	574.10 E	573.46	8.19
5760.00	66.84	89.63	5571.58	67.07 S	617.68 E	617.05	7.65
5807.00	70.23	91.23	5588.78	67.41 S	661.41 E	660.78	7.88
5855.00	72.68	91.23	5604.04	68.38 S	706.91 E	706.26	5.10
5902.00	77.42	90.05	5616.16	68.89 S	752.30 E	751.64	10.37
5942.00	81.19	89.02	5623.59	68.56 S	791.60 E	790.94	9.76
5995.00	85.05	89.02	5629.93	67.66 S	844.20 E	843.55	7.28

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 89.48 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 (CLOSED) AT 5995.00 FEET

HORIZONTAL DISPLACEMENT (CLOSURE) AT 5995.00 FEET
IS 846.90 FEET ALONG 94.58 DEGREES (GRID)

Surface surveys at 450 ft, 850 ft and 1200 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 5942 ft MD to TD at 5995 ft MD.

Date Printed: 18 September 2014