

**PCGC: Pressure Case Gamma**  
**PCDC: Pressure Case Directional**



**1 : 600 / 1 : 240**

[illegible]

## WELL INFORMATION

MWD Run Number	100	200			
Date run completed	17-Jan-13	18-Jan-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)	663.00	5,912.42			
Log End Depth (TVD, ft)	5,912.42	6,660.96			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	15-Jan-13 22:00	16-Jan-13 13:27			
Drill/Wipe End Date and Time	16-Jan-13 22:00	16-Jan-13 13:27			
Min Inc (deg) @ Depth (TVD, ft)	.09 @ 993.00	14.77 @ 5,948.28			
Max Inc (deg) @ Depth (TVD, ft)	13.77 @ 5,025.75	85.70 @ 6,660.96			
Bit TFA(in2) / Bit Type	.75 / PDC	.75 / PDC			
Flow Rate (gpm)	593.91	571.00			
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)	8.70 / 28.00	10.00 / 35.00			
Filtrate CL (ppm)	1,300.00	1,300.00			
pH / Fluid Loss (mptm)	9.30 / 0	9.20 / 7			
PV (cP) / YP (lbf2)	2 / 4.00	9 / 9.00			
% Solids / % Sand	4.5 / 0.20	10.5 / 0.20			
% 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 (deg F) @ Depth (ft)	151.00 @ 1000	175.00 @ 1000			

Max Tool Temp (degF) / Source	154.30 / PCM	175.21 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Henry Schmeidler	Henry Schmeidler			
Customer Representative	Martin Suarez	Martin Suarez			

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.76	5.76			
Sub Serial Number	11341343	11341343			
Insert Serial Number	10997267	10997267			
Date and Time Initialized	15-Jan-13 03:25	01-Jan-70 00:00			
Date and Time Read	18-Jan-13 02:10	18-Jan-13 02:21			
ECMB SW Version	N/A	N/A			

### Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	54.53	52.49			
Software Version	6.21	6.21			
Sub Serial Number	11341343	11341343			
Sonde Serial Number	11478073	11478073			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	319.30	225.07			

### Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.43	47.39			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11341343	11341343			
Insert/Sonde Serial Number	11293287	11293287			

## 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 7.3.5

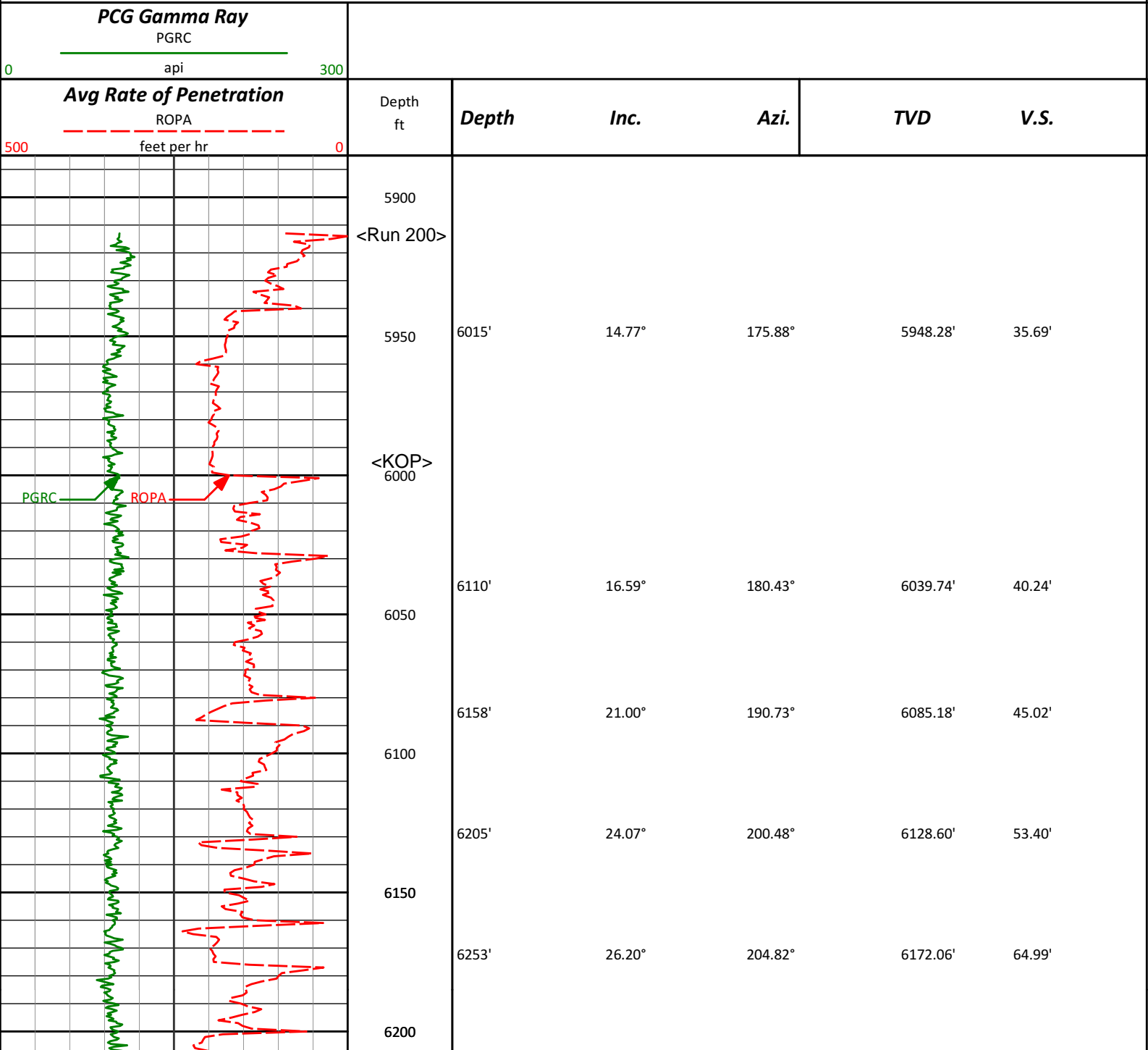
## WARRANTY

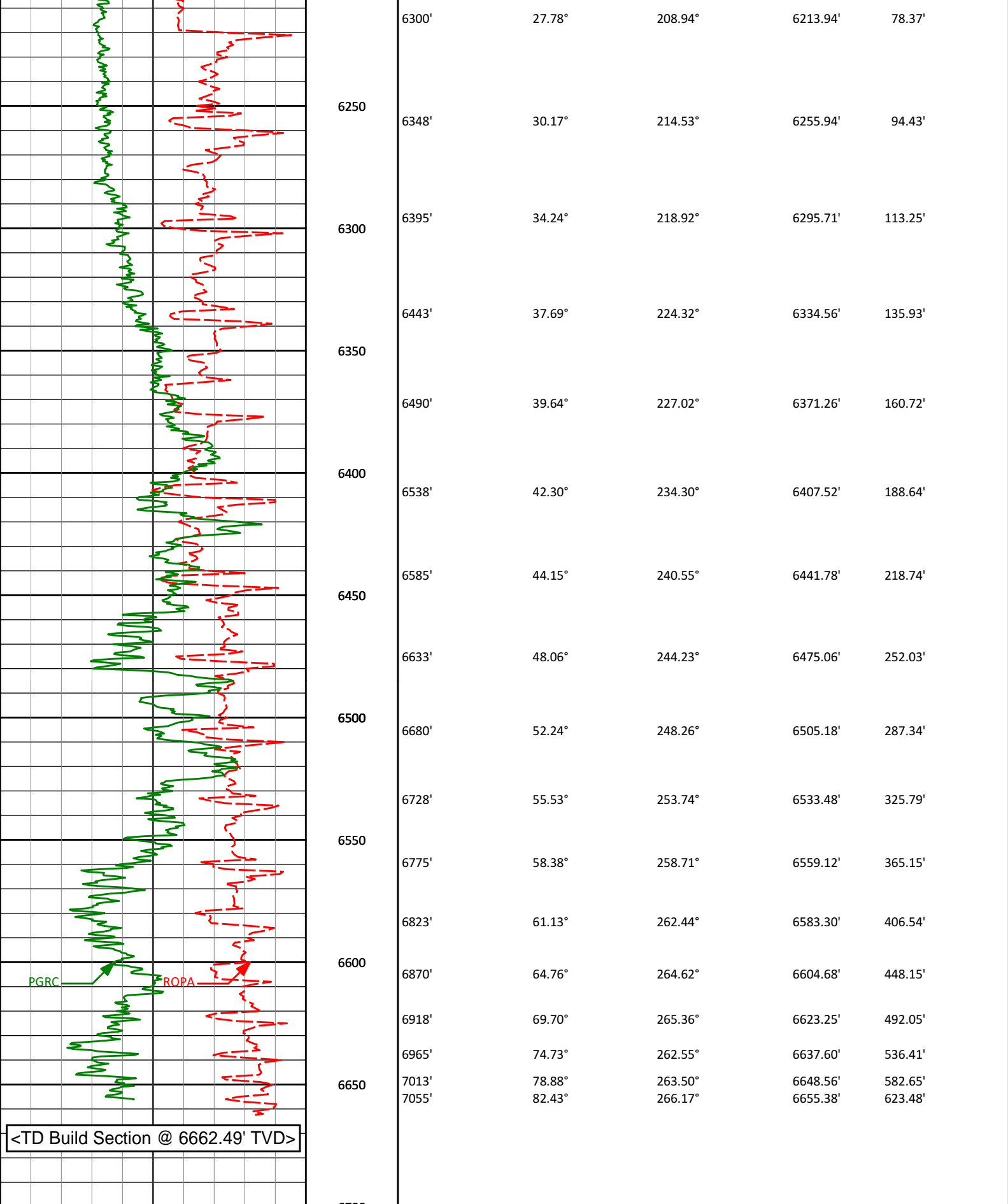
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**HALLIBURTON**  
**Sperry Drilling Services**  
**TVD Main Log 1:600**

Noble Energy, Inc  
SLW Ranch B01-66-1HN  
H&P 315  
T5N R64W

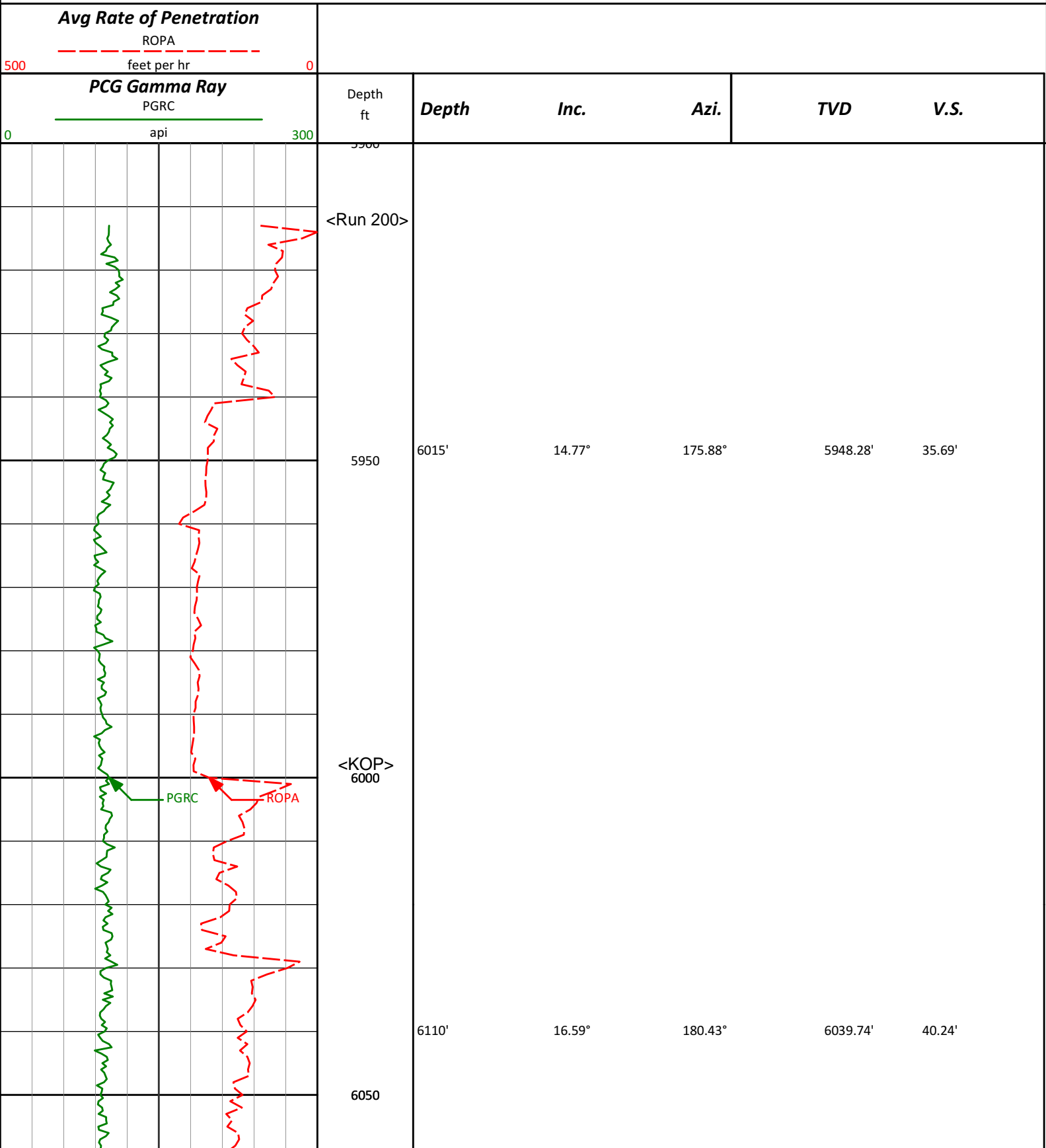


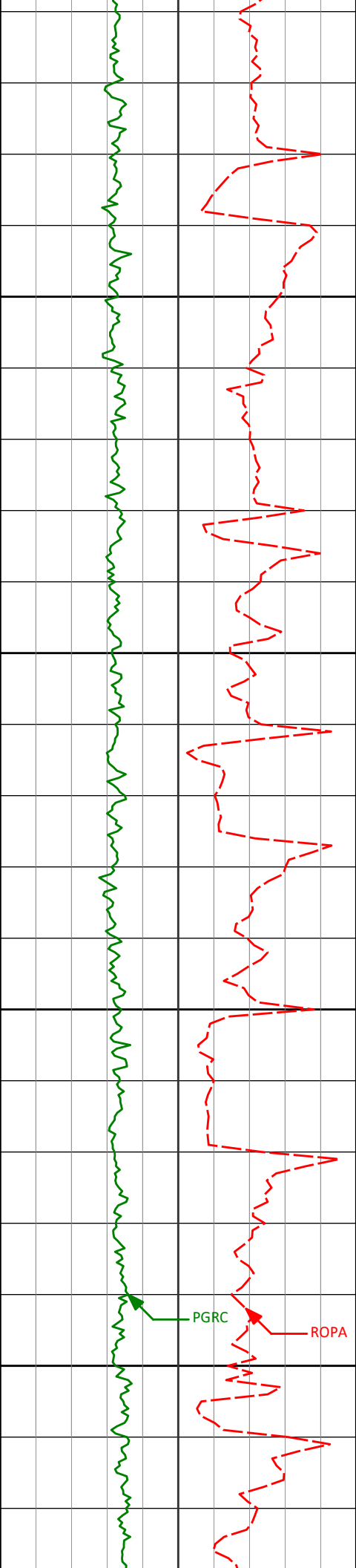


<div><div>Avg Rate of Penetration</div><div>ROPA</div><div>5000 feet per hr</div></div>		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
<div><div>PCG Gamma Ray</div><div>PGRC</div><div>0300 api</div></div>							

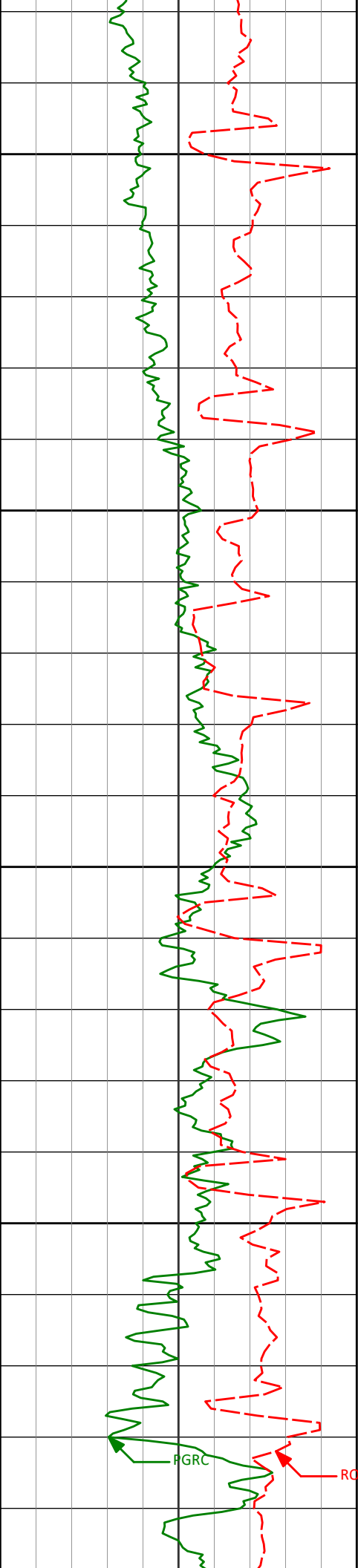
**HALLIBURTON**  
**Sperry Drilling Services**  
**TVD Detail Log 1:240**

Noble Energy, Inc  
SLW Ranch B01-66-1HN  
H&P 315  
T5N R64W





6158'	21.00°	190.73°	6085.18'	45.02'
6205'	24.07°	200.48°	6128.60'	53.40'
6253'	26.20°	204.82°	6172.06'	64.99'
6300'	27.78°	208.94°	6213.94'	78.37'
6348'	30.17°	214.53°	6255.94'	94.43'



6300

6395'

34.24°

218.92°

6295.71'

113.25'

6443'

37.69°

224.32°

6334.56'

135.93'

6350

6490'

39.64°

227.02°

6371.26'

160.72'

6400

6538'

42.30°

234.30°

6407.52'

188.64'

6585'

44.15°

240.55°

6441.78'

218.74'

6450

6633'

48.06°

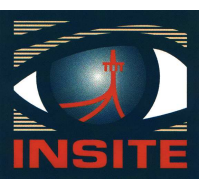
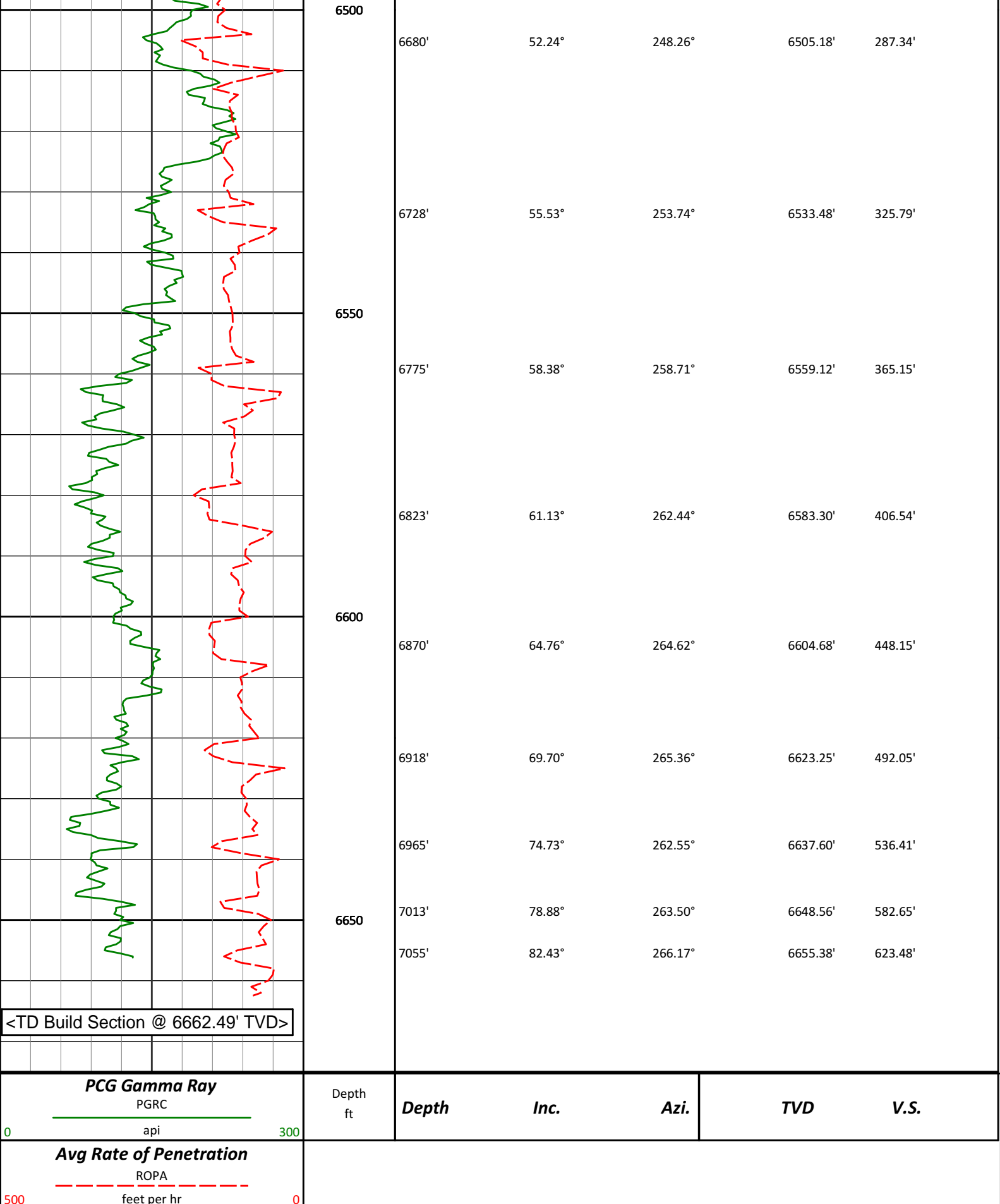
244.23°

6475.06'

252.03'

FGRC

ROPA



**HALLIBURTON**



DIRECTIONAL SURVEY REPORT							
Noble Energy							
SLW Ranch B01-66-1HN							
Wattenberg							
Weld Colorado							
USA							
CA-XX-0900135795							
Survey depth 653 ft created to tie surveys onto bottom of the surface casing shoe.							
Last survey is a projection from 7055 ft MD to TD at 7109 ft MD.							
Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
653.00	0.00	0.00	653.00	0.00 N	0.00 E	0.00	TIE-IN
746.00	0.25	282.53	746.00	0.04 N	0.20 W	0.18	0.27
808.00	0.37	321.40	808.00	0.23 N	0.45 W	0.40	0.38
900.00	0.36	298.52	900.00	0.60 N	0.89 W	0.75	0.16
993.00	0.09	187.73	993.00	0.67 N	1.16 W	1.00	0.43
1085.00	0.26	28.26	1085.00	0.78 N	1.07 W	0.89	0.38
1178.00	0.63	37.51	1177.99	1.37 N	0.66 W	0.36	0.40
1271.00	0.36	6.72	1270.99	2.07 N	0.31 W	-0.12	0.40
1363.00	0.86	251.01	1362.99	2.13 N	0.93 W	0.47	1.16
1458.00	0.78	244.92	1457.98	1.62 N	2.19 W	1.81	0.12
1553.00	0.80	245.67	1552.97	1.08 N	3.38 W	3.09	0.02
1648.00	0.48	218.02	1647.96	0.49 N	4.23 W	4.04	0.46
1743.00	0.69	270.32	1742.96	0.18 N	5.05 W	4.91	0.58
1838.00	0.77	352.92	1837.95	0.82 N	5.71 W	5.42	1.02
1933.00	0.48	37.04	1932.95	1.77 N	5.55 W	5.06	0.57
2028.00	0.35	48.93	2027.94	2.27 N	5.09 W	4.51	0.17
2313.00	0.99	5.81	2312.92	5.29 N	4.19 W	3.01	0.27
2598.00	0.51	12.28	2597.90	8.97 N	3.68 W	1.75	0.17
2883.00	0.37	125.87	2882.89	9.66 N	2.66 W	0.61	0.26
2978.00	1.23	159.37	2977.89	8.52 N	2.06 W	0.25	0.99
3073.00	3.23	180.48	3072.81	4.89 N	1.72 W	0.67	2.24
3168.00	5.56	176.96	3167.52	2.38 S	1.50 W	1.96	2.47
3263.00	7.16	179.75	3261.94	12.90 S	1.23 W	3.87	1.71
3358.00	8.73	172.66	3356.02	25.96 S	0.28 W	5.64	1.94
3453.00	9.12	169.89	3449.88	40.52 S	1.96 E	6.45	0.61
3548.00	10.66	163.84	3543.46	56.38 S	5.73 E	6.04	1.96
3643.00	12.56	167.93	3636.52	74.92 S	10.33 E	5.36	2.18
3738.00	12.95	167.95	3729.17	95.43 S	14.72 E	5.31	0.41
3833.00	13.36	164.19	3821.68	116.40 S	19.93 E	4.54	1.00
3928.00	11.72	167.93	3914.41	136.40 S	24.94 E	3.77	1.92
4023.00	12.36	166.47	4007.32	155.72 S	29.33 E	3.46	0.75
4118.00	12.56	166.20	4100.08	175.64 S	34.18 E	2.84	0.22
4213.00	12.59	174.16	4192.81	195.98 S	37.70 E	3.59	1.82
4308.00	13.23	169.92	4285.41	216.98 S	40.65 E	5.04	1.21
4403.00	13.42	176.95	4377.86	238.70 S	43.14 E	7.09	1.72
4498.00	13.25	170.73	4470.30	260.46 S	45.48 E	9.29	1.52
4593.00	12.57	174.53	4562.90	281.49 S	48.22 E	10.96	1.15
4688.00	13.21	175.01	4655.51	302.60 S	50.15 E	13.43	0.68
4783.00	12.30	172.36	4748.16	323.44 S	52.44 E	15.49	1.14
4878.00	12.60	167.33	4840.93	343.58 S	56.06 E	16.11	1.18
4973.00	13.65	177.32	4933.46	364.89 S	58.86 E	17.78	2.63
5068.00	13.77	175.02	5025.75	387.35 S	60.36 E	20.94	0.59
5163.00	13.15	175.43	5118.15	409.38 S	62.21 E	23.69	0.65
5258.00	12.74	180.00	5210.73	430.63 S	63.07 E	27.24	1.16
5353.00	11.63	173.76	5303.60	450.63 S	64.11 E	30.35	1.81
5448.00	12.70	173.48	5396.46	470.51 S	66.33 E	32.28	1.13
5543.00	13.23	165.84	5489.05	491.43 S	70.18 E	32.84	1.89
5638.00	13.64	167.90	5581.45	512.92 S	75.19 E	32.38	0.67
5733.00	13.09	167.47	5673.87	534.38 S	79.87 E	32.23	0.59
5828.00	13.64	167.51	5766.30	555.82 S	84.62 E	32.00	0.57
5922.00	12.41	174.34	5857.89	576.69 S	88.02 E	32.99	2.09
6015.00	14.77	175.88	5948.28	598.46 S	89.85 E	35.69	2.57
6110.00	16.59	180.43	6039.74	624.10 S	90.62 E	40.24	2.31
6158.00	21.00	190.73	6085.18	639.42 S	88.97 E	45.02	11.48
6205.00	24.07	200.48	6128.60	656.68 S	84.04 E	53.40	10.27
6253.00	26.20	204.82	6172.06	675.47 S	76.17 E	64.99	5.87
6300.00	27.78	208.94	6213.94	694.48 S	66.51 E	78.37	5.21
6348.00	30.17	214.53	6255.94	714.21 S	54.26 E	94.43	7.52

6395.00	34.24	218.92	6295.71	734.24 S	39.25 E	113.25	9.97
6443.00	37.69	224.32	6334.56	755.25 S	20.50 E	135.93	9.76
6490.00	39.64	227.02	6371.26	775.76 S	0.50 W	160.72	5.49
6538.00	42.30	234.30	6407.52	795.64 S	24.84 W	188.64	11.38
6585.00	44.15	240.55	6441.78	812.92 S	51.95 W	218.74	9.91
6633.00	48.06	244.23	6475.06	828.91 S	82.60 W	252.03	9.85
6680.00	52.24	248.26	6505.18	843.40 S	115.63 W	287.34	11.07
6728.00	55.53	253.74	6533.48	855.98 S	152.28 W	325.79	11.48
6775.00	58.38	258.71	6559.12	865.33 S	190.52 W	365.15	10.73
6823.00	61.13	263.25	6583.30	871.81 S	231.46 W	406.54	9.99
6870.00	64.76	264.98	6604.68	876.09 S	273.09 W	448.15	8.38
6918.00	69.70	265.52	6623.25	879.75 S	317.18 W	492.05	10.34
6965.00	74.73	265.58	6637.60	883.22 S	361.79 W	536.41	10.70
7013.00	78.88	267.05	6648.56	886.22 S	408.41 W	582.65	9.15
7055.00	82.43	268.71	6655.38	887.75 S	449.82 W	623.48	9.31
7109.00	85.70	267.30	6660.96	889.62 S	503.49 W	676.38	6.59

**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 258.08 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.90 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 7109.00 FEET  
IS 1022.21 FEET ALONG 209.51 DEGREES (GRID)**

**Date Printed:19 January 2013**