

PCGK: Pressure Case Gamma
PCDC: Pressure Case Directional

1 : 600 / 1 : 240

Country : USA			
Field : Wattenberg			
Location : Lat: 40° 42' 53.78" North Long: 103° 59' 59.78" West			
Well : Rico LC29-74-1HNA			
Company : Noble Energy			
Rig : H&P 273			
LOCATION			
Latitude : 40° 42' 53.78" North Longitude : 103° 59' 59.78" West			
UTM Easting = 3,415,821,490 ft UTM Northing = 1,506,813,770 ft			
Company : Noble Energy Rig : H&P 273 Well : Rico LC29-74-1HNA Field : Wattenberg Country : USA API Number : 05-123-38777			
Other Services Directional Drilling			
Permanent Datum : Ground Level Log Measured From : Drill Floor Drilling Measured From : Drill Floor			
Elevation : 4871.00 ft 24.00 ft Above Permanent Datum			
TVD LOG			
Depth Logged : 639.98 ft To 6,026.21 ft Date Logged : 08-May-14 To 09-May-14 Total Depth MD : 6,415.00 ft TVD : 6,026.21 ft Spud Date : 07-May-14			
Unit No. : 11703717 Plot Type : Final Plot Date : 11-May-14			
Job No. : CA-XX-0901286889			
Borehole Record (TVD)			
Run No.	Size	From	To
2	8.750 in	639.98 ft	5,322.84 ft
3	8.750 in	5,322.84 ft	6,026.21 ft
Casing Record (TVD)			
Size	Weight	From	To
7.000 in	26.00 lbpf	SURFACE	6,025.75 ft

WELL INFORMATION

MWD Run Number	100	200		
Date run completed	09-May-14	10-May-14		
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)	632.98	5,322.84		
Log End Depth (TVD, ft)	5,322.84	6,026.21		
Drill or Wipe	Drill	Drill		
Drill/Wipe Start Date and Time	08-May-14 16:10	09-May-14 12:30		
Drill/Wipe End Date and Time	09-May-14 03:05	09-May-14 23:30		
Min Inc (deg) @ Depth (TVD, ft)	0.00 @ 1,365.97	1.27 @ 5,296.85		
Max Inc (deg) @ Depth (TVD, ft)	13.07 @ 2,295.41	81.31 @ 6,021.18		
Bit TFA(in2) / Bit Type	0.74 / PDC	0.98 / PDC		
Flow Rate (gpm)	598.77	556.59		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A		
Fluid Type	Polymer	Polymer		
Density (ppg) / Viscosity (spqt)	9.50 / 42.00	10.60 / 46.00		
Filtrate CL (ppm)	150.00	150.00		
pH / Fluid Loss (mptm)	8.00 / 0	8.50 / 0		
PV (cP) / YP (Ihf2)	14 / 9.00	16 / 11.00		
% Solids / % Sand	5.7 / .15	12.8 / .25		
% 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 (degF) / Source	137.50 / PCM	154.30 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Paul Kock	Paul Kock			
Customer Representative	Justin Fields	Justin Fields			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.76	5.76			
Sub Serial Number	11404264	11404264			
Insert Serial Number	11055839	11055839			
Date and Time Initialized	08-May-14 02:56	08-May-14 02:56			
Date and Time Read	10-May-14 06:33	10-May-14 06:31			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	53.95	52.38			
Software Version	6.21	6.21			
Sub Serial Number	11404264	11404264			
Sonde Serial Number	10993472	10993472			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	194.82	102.93			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	48.85	47.28			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404264	11404264			
Insert/Sonde Serial Number	11293394	11293394			

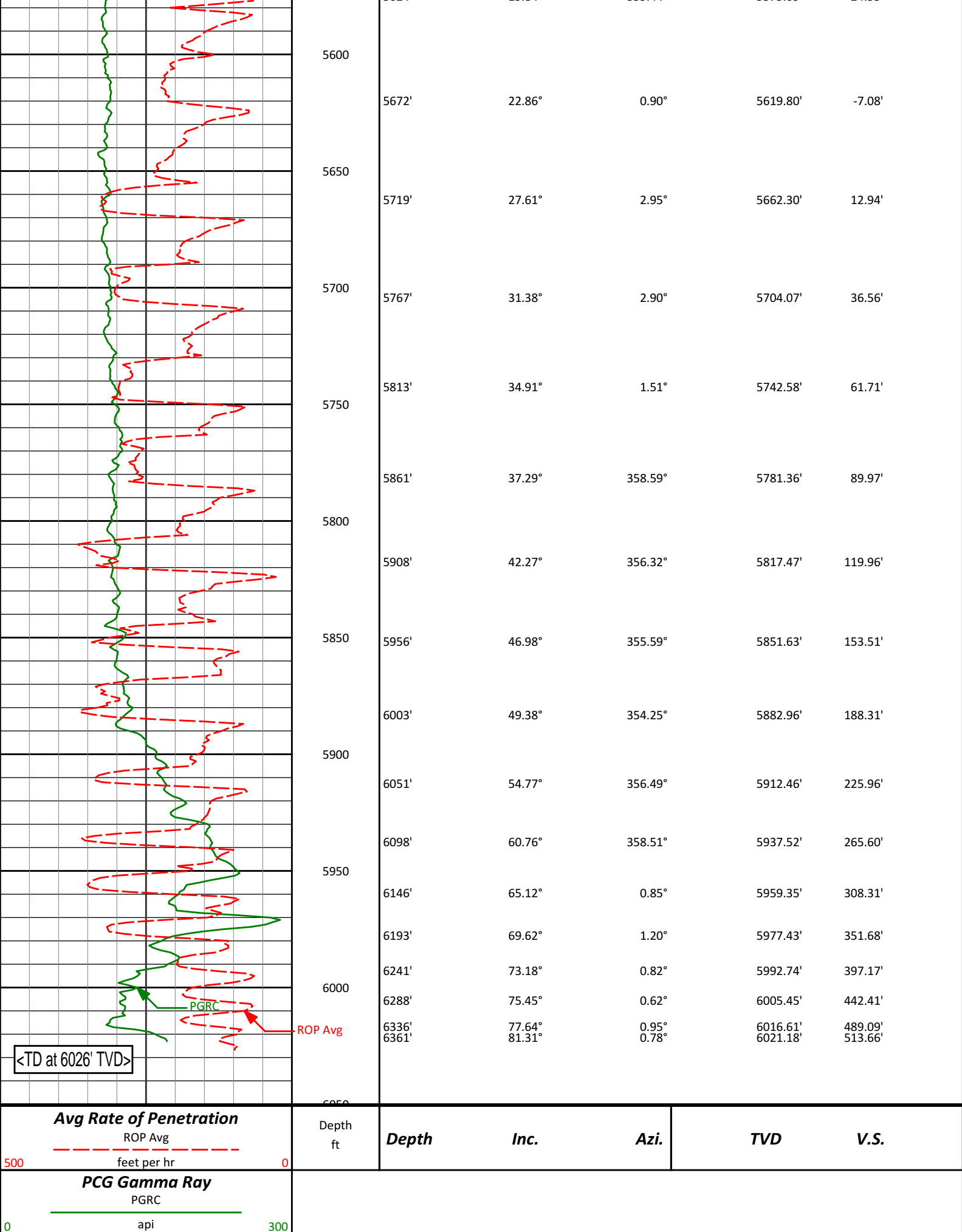
REMARKS

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 Main Log 1:600

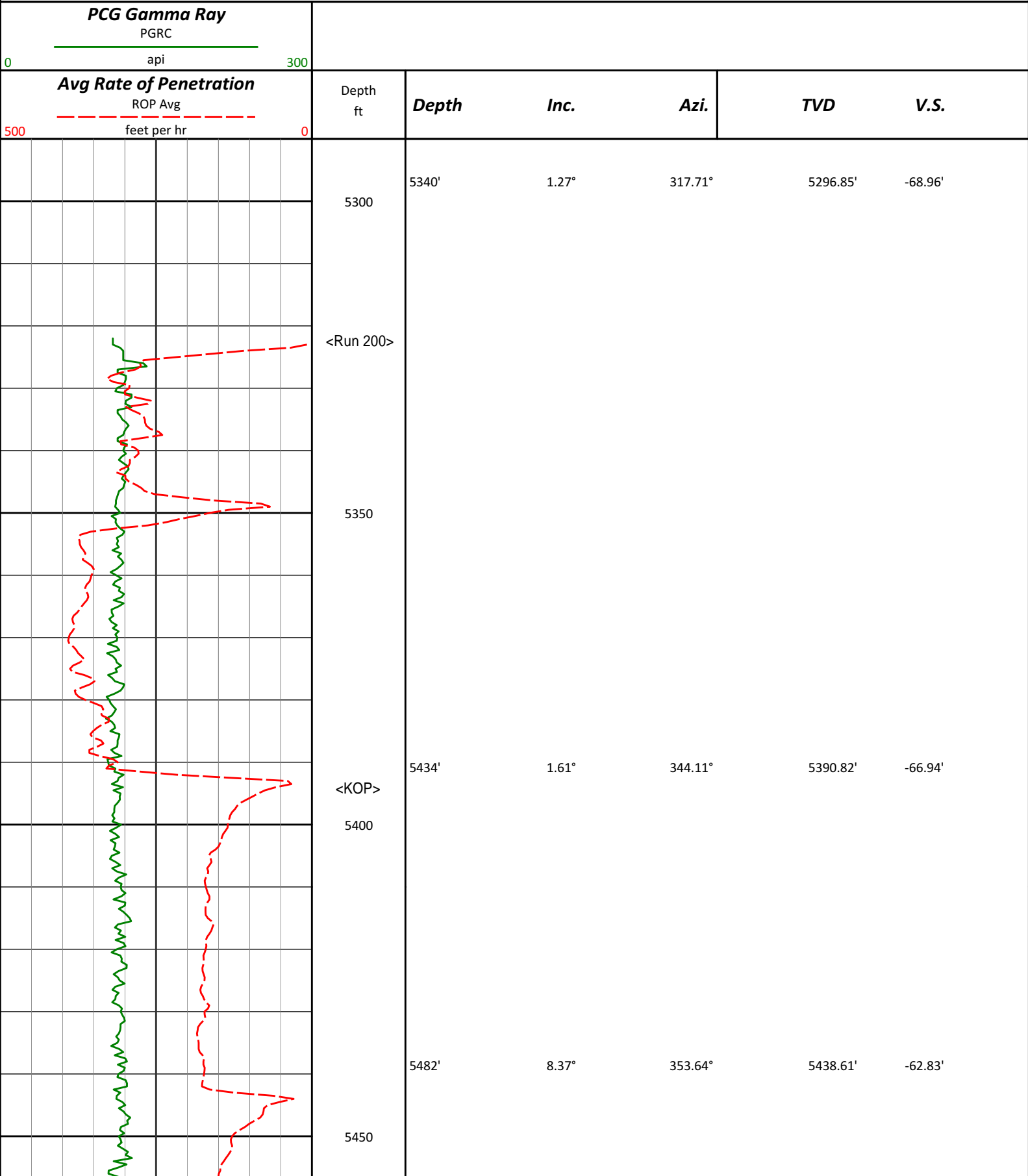
PCG Gamma Ray PGRC 0 300 api								
Avg Rate of Penetration ROP Avg 500 0 feet per hr			Depth ft	Depth	Inc.	Azi.	TVD	V.S.
			5300	5340'	1.27°	317.71°	5296.85'	-68.96'
			<Run 200>					
			5350					
			<KOP> 5400	5434'	1.61°	344.11°	5390.82'	-66.94'
			5450	5482'	8.37°	353.64°	5438.61'	-62.83'
			5500	5529'	14.97°	357.34°	5484.61'	-53.37'
			5550	5577'	18.00°	358.61°	5530.64'	-39.78'
			5600	5624'	19.84°	359.44°	5575.09'	-24.55'

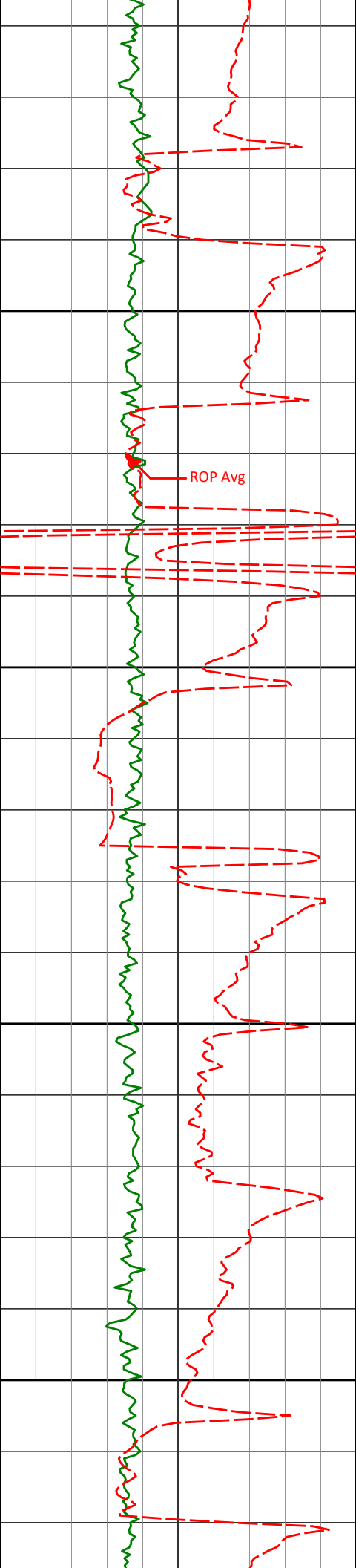


Sperry Drilling Services

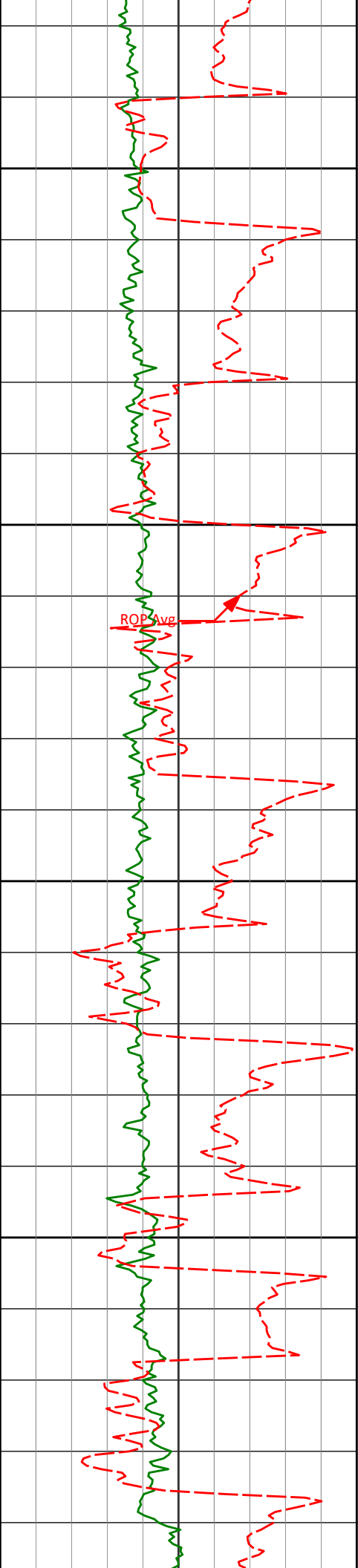
TVD Detail Log 1:240

Noble Energy
Rico LC29-74-1HNA
H&P 273
T9N, R59W





5529'	14.97°	357.34°	5484.61'	-53.37'
5500				
5577'	18.00°	358.61°	5530.64'	-39.78'
5550				
5624'	19.84°	359.44°	5575.09'	-24.55'
5600				
5672'	22.86°	0.90°	5619.80'	-7.08'
5650				
5719'	27.61°	2.95°	5662.30'	12.94'



5700

5767'

31.38°

2.90°

5704.07'

36.56'

5813'

34.91°

1.51°

5742.58'

61.71'

5750

5861'

37.29°

358.59°

5781.36'

89.97'

5800

5908'

42.27°

356.32°

5817.47'

119.96'

5850

5956'

46.98°

355.59°

5851.63'

153.51'

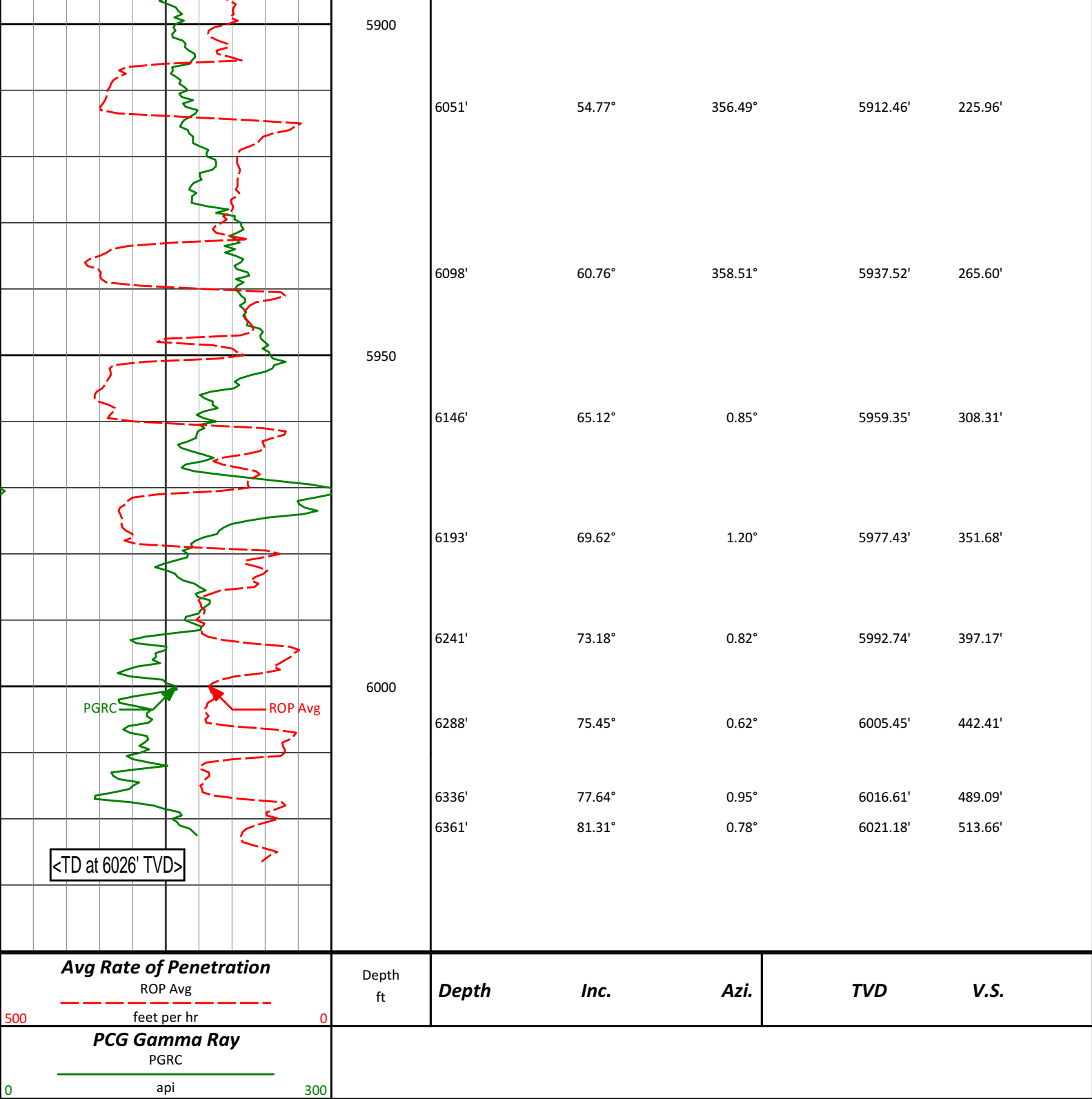
6003'

49.38°

354.25°

5882.96'

188.31'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

**Noble Energy
Rico LC29-74-1HNA
Wattenberg
Weld Colorado
USA
CA-XX-0901286889
Surveys are IFR1 and MSA corrected.**

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
-----------------------------	--------------------------	------------------------	-----------------------------	--------------------	---------------------	-------------------------------	-----------------------

	(feet)	(degrees)	(degrees)	(feet)	(feet)	(feet)	(feet)	(deg/foot)
	0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
	370.00	0.50	351.35	370.00	1.60 N	0.24 W	1.59	0.14
	620.00	0.60	324.05	619.98	3.73 N	1.18 W	3.71	0.11
	809.00	0.32	4.40	808.98	5.06 N	1.72 W	5.02	0.22
	994.00	0.47	4.20	993.97	6.33 N	1.62 W	6.29	0.08
	1273.00	0.09	155.14	1272.97	7.28 N	1.44 W	7.24	0.20
	1366.00	0.00	119.56	1365.97	7.21 N	1.41 W	7.17	0.10
	1459.00	0.14	22.97	1458.97	7.31 N	1.37 W	7.28	0.15
	1554.00	0.17	62.32	1553.97	7.49 N	1.20 W	7.46	0.11
	1645.00	3.16	111.06	1644.92	6.65 N	1.26 E	6.68	3.35
	1738.00	5.69	108.57	1737.64	4.26 N	8.02 E	4.45	2.73
	1833.00	8.07	108.37	1831.95	0.66 N	18.82 E	1.10	2.51
	1927.00	10.54	109.97	1924.70	4.36 S	33.16 E	-3.57	2.64
	2022.00	13.01	109.59	2017.70	10.91 S	51.41 E	-9.69	2.60
	2117.00	12.98	109.82	2110.26	18.12 S	71.52 E	-16.41	0.06
	2212.00	12.94	109.10	2202.84	25.21 S	91.61 E	-23.03	0.18
	2307.00	13.07	108.89	2295.41	32.17 S	111.82 E	-29.51	0.15
	2402.00	12.44	109.53	2388.06	39.07 S	131.63 E	-35.94	0.68
	2497.00	12.21	109.81	2480.87	45.90 S	150.72 E	-42.31	0.25
	2591.00	11.83	108.77	2572.81	52.37 S	169.20 E	-48.34	0.47
	2687.00	11.82	108.97	2666.77	58.73 S	187.81 E	-54.25	0.04
	2781.00	11.81	99.32	2758.79	63.42 S	206.41 E	-58.50	2.10
	2876.00	11.85	98.21	2851.77	66.38 S	225.66 E	-61.01	0.24
	2971.00	11.85	97.88	2944.75	69.11 S	244.98 E	-63.28	0.07
	3066.00	11.46	97.96	3037.79	71.76 S	263.98 E	-65.47	0.41
	3161.00	10.96	98.44	3130.98	74.39 S	282.26 E	-67.67	0.54
	3256.00	9.65	98.59	3224.44	76.91 S	299.07 E	-69.79	1.38
	3351.00	9.52	100.87	3318.12	79.58 S	314.66 E	-72.09	0.42
	3446.00	9.74	100.90	3411.78	82.58 S	330.26 E	-74.72	0.23
	3540.00	10.11	101.88	3504.37	85.78 S	346.15 E	-77.54	0.43
	3635.00	10.50	102.82	3597.84	89.42 S	362.75 E	-80.78	0.45
	3730.00	10.83	102.11	3691.20	93.21 S	379.91 E	-84.17	0.37
	3825.00	9.65	99.09	3784.68	96.34 S	396.50 E	-86.90	1.36
	3920.00	8.46	90.12	3878.50	97.61 S	411.35 E	-87.82	1.94
	4014.00	5.99	90.18	3971.75	97.64 S	423.18 E	-87.57	2.63
	4109.00	4.25	84.03	4066.37	97.29 S	431.63 E	-87.02	1.92
	4204.00	1.84	79.81	4161.23	96.66 S	436.64 E	-86.27	2.55
	4299.00	1.72	78.86	4256.18	96.11 S	439.54 E	-85.65	0.13
	4394.00	1.93	63.85	4351.13	95.13 S	442.37 E	-84.60	0.55
	4488.00	2.09	44.67	4445.08	93.21 S	445.00 E	-82.63	0.73
	4583.00	2.25	33.40	4540.01	90.42 S	447.24 E	-79.78	0.48
	4678.00	0.37	57.47	4634.98	88.70 S	448.53 E	-78.03	2.02
	4773.00	0.65	304.44	4729.98	88.23 S	448.34 E	-77.57	0.91
	5057.00	1.39	325.36	5013.93	84.49 S	445.06 E	-73.90	0.29
	5152.00	1.51	316.03	5108.90	82.64 S	443.53 E	-72.09	0.28
	5247.00	1.40	312.40	5203.87	80.96 S	441.81 E	-70.45	0.15
	5310.00	1.20	321.28	5266.85	79.92 S	440.82 E	-69.44	0.45
	5340.00	1.27	317.71	5296.85	79.43 S	440.40 E	-68.96	0.35
	5434.00	1.61	344.11	5390.82	77.39 S	439.34 E	-66.94	0.78
	5482.00	8.37	353.64	5438.61	73.27 S	438.77 E	-62.83	14.14
	5529.00	14.97	357.34	5484.61	63.79 S	438.11 E	-53.37	14.13
	5577.00	18.00	358.61	5530.64	50.18 S	437.64 E	-39.78	6.36
	5624.00	19.84	359.44	5575.09	34.94 S	437.39 E	-24.55	3.96
	5672.00	22.86	0.90	5619.80	17.47 S	437.45 E	-7.08	6.39
	5719.00	27.61	2.95	5662.30	2.54 N	438.16 E	12.94	10.27
	5767.00	31.38	2.90	5704.07	26.14 N	439.36 E	36.56	7.85
	5813.00	34.91	1.51	5742.58	51.27 N	440.32 E	61.71	7.85
	5861.00	37.29	358.59	5781.36	79.54 N	440.32 E	89.97	6.12
	5908.00	42.27	356.32	5817.47	109.57 N	438.95 E	119.96	11.04
	5956.00	46.98	355.59	5851.63	143.19 N	436.57 E	153.51	9.87
	6003.00	49.38	354.25	5882.96	178.08 N	433.46 E	188.31	5.53
	6051.00	54.77	356.49	5912.46	215.80 N	430.43 E	225.96	11.82
	6098.00	60.76	358.51	5937.52	255.50 N	428.72 E	265.60	13.25
	6146.00	65.12	0.85	5959.35	298.23 N	428.50 E	308.31	10.07
	6193.00	69.62	1.20	5977.43	341.59 N	429.28 E	351.68	9.60
	6241.00	73.18	0.82	5992.74	387.07 N	430.08 E	397.17	7.45
	6288.00	75.45	0.62	6005.45	432.31 N	430.64 E	442.41	4.85
	6336.00	77.64	0.95	6016.61	478.99 N	431.28 E	489.09	4.61
	6361.00	81.31	0.78	6021.18	503.56 N	431.66 E	513.66	14.70
	6415.00	88.00	0.71	6026.21	557.29 N	432.35 E	567.40	12.39

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 1.36 DEGREES (GRID)
A TOTAL CORRECTION OF 7.16 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6415.00 FEET
IS 705.34 FEET ALONG 37.80 DEGREES (GRID)**

Surface surveys at 370 ft and 620 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Final survey is a projection from 6361' MD to TD at 6415' MD.

Date Printed:11 May 2014